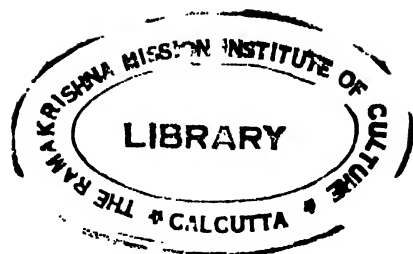


19931





Government of Bengal

Irrigation Department

**Report of the
Irrigation Department Committee
1930**

CALCUTTA

Bengal Secretariat Book Depot

1930

**Published by the Bengal Secretariat Book Depot,
Writers' Buildings, Calcutta.**

Agents in India.

Messrs. S. K. Lahiri & Co., Printers and Booksellers, College Street, Calcutta.

Messrs. Thacker, Spink & Co., Calcutta.

**Customers in the United Kingdom and the Continent of Europe
may obtain publications either direct from the High Commissioner's office
or through any bookseller.**

CONTENTS.

	PAGE.
The Irrigation Department Committee, 1930	4
Chapter—	
I—Introductory	5-6
II—General	6-7
III—The work of the Irrigation Department	8-9
IV—The need for development	9-12
V—The present organisation of the Irrigation Department	12-13
VI—The need of a separate organisation for waterways	13-14
VII—The re-organisation of the Irrigation Department	14-16
VIII—Proposals for revising the procedure for improvement schemes	16-19
IX—The formation of a Waterways Trust	19-20
X—The participation of the neighbouring provinces	20-22
XI—The constitution of the Trust	22-24
XII—The duties and procedure of the Trust	24-26
XIII—The finance of the Trust	26-28
XIV—Conclusion	28-30
Appendix A	31
Appendix B	31-34
Appendix C	35

The Irrigation Department Committee,
1930.

Mr. W. S. Hopkyns, C.I.E., O.B.E., I.C.S., Chairman.

Mr. D. G. Harris, C.I.E., Consulting Engineer to the Government of India, Member.

Mr. J. B. G. Smith, C.I.E., Chief Engineer, Irrigation Department, Punjab, Member.

Mr. A. E. Porter, I.C.S., Secretary.

Report of the Irrigation Department Committee, 1930.

Chapter I.

Introductory.

The Committee was constituted by notification of the Government of Bengal, Irrigation Department, No. 3084 I. E., dated the 30th November 1929.

2. Mr. Hopkyns joined as Chairman of the Committee on the 2nd January 1930. Mr. Harris and Mr. Smith, the other members, joined respectively on the 3rd and 6th January 1930.

3. Under the terms of reference, defined in the resolution appointing the Committee, we were directed :—

(I) To discuss the work at present undertaken by the Irrigation Department in Bengal in respect of irrigation, the maintenance of waterways, the resuscitation of rivers, the control of floods and the drainage of water-logged areas.

(II) To make recommendations as to the desirability of the creation of a separate department to deal with the waterways of the province, to define the scope of its functions and those of the Irrigation Department, to discuss, if separation is advocated, the method of separation and to make recommendations as to the constitution and strength of each department.

(III) To consider the advisability of the formation of a provincial waterways board and the desirability or otherwise of the representation upon it of the provinces of Bihar and Orissa and Assam, in order to secure co-ordination in respect of policy and methods of river conservation throughout the Ganges-Brahmaputra-Meghna series of rivers. To define the status, powers and functions of the Board and its relations to the Government of Bengal and to the Civil and Irrigation Departments of that Government.

(IV) To advise on the problem of finance.

4. In considering the terms of reference two principal objects have been kept in view. In the first place we have considered it important to examine as much as possible of the work of the Irrigation Department and to discuss it and the problems arising from it with officers of the department. Since the problems in different areas are widely different and some of them probably unique we have also thought it necessary to see for ourselves as much of the province as possible and to form an idea of local needs on the spot. In the second place we have

attempted to elicit the opinion of officials, local bodies, individuals and corporations interested in the work of the Irrigation Department.

5. In addition, therefore, to the examination of papers we have toured as much as we could and we append a diary of our tours (Appendix A). We have seen irrigation projects in operation in Midnapore, Burdwan and Mymensingh districts, and the Damodar Canal under construction. We have inspected on the spot the very serious problem arising from the embankments within the river systems of the Cossye, Selye, Damodar and Rupnarayan rivers. We have seen the revetments for the protection of Pabna and Rajshahi towns and the site of that projected for Sirajganj. We have inspected the Magra Hat drainage and Gobra nala flushing schemes and the canals maintained by the Irrigation Department near Calcutta and in Midnapore. We have seen the work undertaken in the interests of navigation through the Steamer Companies in the Padma, the Sundarbans route and the Dhaleswari and by the department itself in the Madaripur Bil and Lower Kumar steamer route. The Chief Engineer accompanied us on most of our tours, and we have discussed with the Superintending and Executive Engineers the work in their circles and divisions. We have also traversed a considerable part of the major navigable waterways of the province.

6. In pursuit of our second object we took the opportunity afforded by our tours to elicit local opinion upon our terms of reference. The resolution by which we were constituted contained a clause inviting the submission of representations or recommendations and was published in the *Calcutta Gazette* and in the public press. In addition to publication in this way the resolution was also sent with an invitation to submit their opinions to local officers, local bodies, railway and steamer companies, commercial associations and individuals likely to be interested or to be able to assist us with their advice and opinions, and although we issued no questionnaire, a list of questions was circulated for the assistance of those who wished to lay their views before us. We elicited in this way a considerable body of written opinion. This was supplemented in many cases by oral evidence. Neither the written nor the oral evidence is published with our report, but copies of it have been submitted to Government and we annex in Appendix B a list of the bodies or individuals whose oral evidence we took with a note of the place at which they were examined and in Appendix C

a list of the written representations received from bodies or individuals not orally examined.

7. Our report, based upon the material which we have examined, is contained in the chapters which follow. We desire in submitting it to record our gratitude to the Chief Engineer, Irrigation Department, Mr. C. Addams Williams, C.I.E., who has not only facilitated our access to such documents as we desired to consult but has also given us the benefit of his unrivalled knowledge of Bengal, its rivers and their problems. We are much indebted to the Steamship and Railway Companies who made special arrangements enabling us to cover a great deal of ground in

the short time at our disposal. We are also grateful to all those who, often at the expense of considerable labour and inconvenience to themselves, assisted us either by sending written memoranda or by giving evidence before us.

8. Our special thanks are due to Mr. A. E. Porter, our Secretary, who, in spite of the difficulties caused by constant touring, succeeded in keeping the records of our evidence and discussions up to date and has rendered us the greatest assistance in every direction. But for the efforts of Mr. Porter and his office staff, whose services we also desire to acknowledge, it would have been impossible for us to complete our labours within the allotted time.

Chapter II.

General.

9. "The problems that await solution in Bengal, if indeed the problems presented can be completely solved, are complex in the extreme." In these words the Royal Commission on Agriculture in India summed up their review of the water problems in Bengal, and nothing has impressed us more than this complexity. As we passed from one district to another we passed from one set of conditions to another, with different needs and different demands. In the west, with a comparatively short monsoon and small rainfall, the chief demand is for irrigation to ensure crops, but the main problem which has to be solved in this area, if disaster is to be avoided and fertility restored, is that presented by the embankments which were erected by generations long since past to protect their lands from flood. Further north, in a country where the officers of the Irrigation Department are almost unknown, there is the same need for irrigation, but in these northern districts and in central Bengal, where the rivers which once built up the delta of the Ganges now lie stagnant, the most important problem is to restore the flow of water in the rivers. Both nature and man have contributed to the state of affairs which now exists. The decay of the rivers in the central districts is attributable primarily to natural causes but further to the south the embankments which have reclaimed the fertile land in the Sundarbans have stopped the spread of the tidal waters and are killing the rivers, threatening the very existence of the link which connects the Hooghly with the steamer route to the east. Fortunately, the intervention of the Irrigation Department has prevented a repetition in the Khulna Sundarbans of the process by which the rivers in the 24 Parganas are being destroyed. It is a relief to pass into the happier land of eastern Bengal where, apart from the obstructions caused by roads and railways with bridges of insufficient waterway, the floods from the great rivers are left free to fertilise the land and scour out the rivers as they pass. But though little harm has been done by the hand of man, the activity of the rivers themselves creates problems which demand constant attention. As they swing

from bank to bank erosion never ceases, new channels are formed and new shoals appear. In every district the *khals* which carry the internal boat traffic become, from time to time, blocked with silt. Its *khals* and rivers are the roads and highways of eastern Bengal and it is impossible to overestimate the importance to the economic life of this part of the province of maintaining them in proper navigable order.

10. It is a remarkable fact that, in spite of the great importance of the rivers of Bengal and their influence on the health and prosperity of the people, they have, in the past, been singularly neglected. From time to time there has been uneasiness as to their condition, and it was such uneasiness which led to the appointment of the Drainage Committee in the Presidency Division in 1907, to Major Hirst's investigation of the Nadia Rivers in 1914-15, and to the appointment of a committee on the latter subject in 1915. Nothing systematic has, however, been done to improve them. Until 1921 there was not even a separate department to take charge of them. Prior to that year irrigation and water problems in Bengal were entrusted to four out of the fourteen executive divisions of the Public Works Department. Not only were these four officers also responsible for the roads and buildings within their divisions, in consequence of which they were unable to devote their full time to hydraulic problems, but officers with little or no hydraulic training had frequently to take control of these irrigation charges. The result was that the rivers were not systematically studied except in Divisions in which enthusiasts devoted to that study the concentration and specialisation which it requires.

11. Even after 1920, although the creation of a separate Irrigation Department made some degree of specialisation possible, there was hardly any increase in the staff, and officers were given charges clearly beyond the power of any one man to fill. Thus the charge of the Executive Engineer, Khulna Division, still to-day includes the whole of the two Commissioners' Divisions of Dacca and Chittagong, the

Khulna district, and much of the districts of Jessore and the 24-Parganas. It is, in these circumstances, not surprising that the representatives of the District Board of Chittagong had never seen the officer in question, or that other districts within his division felt that they were not receiving from the Irrigation Department the attention to which they were entitled. In northern Bengal seven districts of the Rajshahi Division share the services of one subdivisional officer, most of whose work lies along the banks of the Ganges and Brahmaputra. This lack of staff in northern and eastern Bengal is not due to any belief that there is no work to be done in these areas but simply to the fact that there is no officer available. The lack of staff is made the more striking by a comparison with the staff provided for public health and agricultural work. There is now a Health Officer and an Agricultural Officer in almost every district and there will soon be a Sanitary Officer in every *thana*.

12. The inevitable result of this position is that, generally speaking, the capacity of the Irrigation Department for extending its activities in new directions has been severely limited. Its work on irrigation, embankments and drainage has been almost confined to the Burdwan Division and the environs of Calcutta, but in maintaining and improving the boat and steamer routes to Eastern Bengal it has rendered service which, though it attracts little notice or popular approval, is essential to the life of the province. The work done has been valuable, but in the greater part of the province it has not been able to carry out that class of work for which there is both a popular demand and an urgent need, the work of flushing unwholesome channels and stagnant swamps and restoring decayed rivers and blocked *khals* to activity.

13. In such circumstances it is easy to blame the officers of the department, but, such blame ignores facts, and we desire to place on record our opinion that the Chief Engineer and his staff have done the utmost in their power to cope with the immense burden placed upon them. They are as conscious as their critics of the fact that much which ought to be done is left undone, but we consider that the most which can be said against them is that they have been reluctant, and in our opinion rightly so, to take up new work for which they had neither the time nor the staff nor the funds. Ten years ago they proved the need for more staff and its employment was sanctioned by the Secretary of State, but funds for its engagement have never been provided; they have prepared projects which have been approved by all authorities but no funds for their execution have been available. For this lack of money they are not responsible.

14. Those of us who were previously unacquainted with the system of land tenure in Bengal have been much struck with its effect upon projects such as those designed for the improvement of drainage or agriculture. In Northern India Government are always ready to finance projects of this nature since, even if they yield no direct return in the form of water-rates, they constitute a remunerative investment

of the general tax-payer's money. There is not only an immediate increase in land revenue which accrues to the State when uncultivated land is brought under cultivation but also a prospect of a further enhancement when next the land is settled. In Bengal, except in the small areas where Government are the proprietors of the land, they secure no increase of land revenue, either immediate or prospective, from improvements financed by them or effected through their agency, and past experience proves that they are fortunate if they recover for the tax-payer the cost of the work and its maintenance.

15. We have dwelt at some length on the position of the Irrigation Department and on the financial and other obstacles which have hampered its work, not only because a proper appreciation of these factors is necessary for an understanding of the questions before us, but also because it is but fair to the Irrigation Department that they should be stated. For the same reason, we cannot but refer to the campaign of criticism of which the department has been the object for the past two years. This campaign derived its inspiration from a lecture delivered by Sir William Willcocks in March 1928, followed by articles from his pen in the public press. In these he advanced a theory of his own as to the nature of the various effluents of the Ganges and took the department to task for not having devoted their energies to the restoration of the ancient artificial systems of irrigation which, according to this theory, existed in Bengal in the past. It is not for us to deal in detail with the attack which he has made upon the department, but we cannot refrain from remarking that we regard the assertion recently made by him in a lecture before the University of Calcutta that as a result of the department's misapplied activity Bengal is "strewn to-day with the wrecks of useless and harmful works" to be as unfair as it is unfounded. We feel, moreover, that it is due to the department that we should say that we have found nothing in the facts adduced by Sir William Willcocks in his lectures which we should be prepared to accept as even reasonably convincing evidence in support of his theory of the origin of the Nadia rivers and of the existence in the past in Bengal of artificial systems of irrigation, such as he describes. Many of the conclusions at which he has arrived appear to those of us who are engineers to be based largely upon incorrect premises and insufficient data; they are certainly not such as can be blindly accepted in the way which he advocates. We shall in later chapters endeavour to indicate the method of approach if a rational solution of the problems of western and central Bengal is to be sought. We should have abstained from commenting upon Sir William Willcocks' views did we not feel, first, that his criticisms may, if left unnoticed, impair public confidence in the department at a time when such confidence is most needed and, secondly, that it is of the utmost importance that the people of Bengal should not be lulled into a false belief that the improvement of the decadent tracts can be other than a difficult and lengthy operation.

Chapter III.

The work of the Irrigation Department.

16. Bengal is not primarily an irrigation province and to this extent the term "Irrigation Department," as applied to the organisation responsible for the construction and maintenance of hydraulic works throughout the Presidency, is a misnomer. Less than a third of the strength of the department is employed upon schemes pertaining to irrigation in the strict sense of the word; the remainder are chiefly employed on embankment, drainage and navigation work.

17. It will probably be useful if we commence our report with a brief account of the work at present undertaken by the department. We deal first with irrigation proper. Two canals of some magnitude, the Midnapore and Eden Canals, and two much smaller works, the Salbandh and Amjore projects, are in operation in the province. The Midnapore Canal, in the district of that name, was constructed by a private company, in the middle of the last century, as part of an ambitious scheme which was to provide a great navigable highway from Calcutta to the Chilka Lake, while at the same time irrigating the country traversed; the project proved however to have been grossly underestimated, the company failed, and the incomplete works were taken over by the State. The link between the Midnapore and Orissa Canals was never constructed, owing to the unwillingness of the cultivators in the tract to take water for irrigation, and thus the Midnapore Canal was given the status of a separate project. It is still used for navigation to a certain extent and about 80,000 acres are irrigated annually from it, the receipts sufficing to cover the working expenses but contributing little or nothing towards the interest on the capital cost.

18. The Eden Canal is a minor work; it was originally constructed as a sanitary measure to flush old river beds and to afford a supply of drinking water to a malarious tract in the Burdwan district. Shortly after it was opened, however, the practice of irrigating from it sprang up and its primary objects were somewhat lost sight of. It irrigates about 20,000 acres annually, but the arrangements for diverting water into it are unsatisfactory and its supply is precarious. The other two schemes mentioned in paragraph 17 are insignificant, irrigating between them only about 2,600 acres.

19. Two further irrigation projects are, at present, under construction. The Damodar Canal, which has its headworks on the river of that name, will irrigate about 200,000 acres annually in a tract in the Burdwan and Hooghly districts which is subject to periodical scarcity. Water from the Damodar Canal will also be passed into the Eden Canal, which will thus be assured of an adequate supply both for irrigation and for sanitary purposes. The second work under construction is the Bakreswar Canal, a small scheme designed to irrigate some 10,000 acres annually in Birbhum.

20. Recently, to meet the demand for further irrigation in the west of the province, a special division, the Bankura Division, was opened with a view to surveys being made and

projects prepared in the Midnapore, Bankura, Birbhum and Burdwan districts. Progress has necessarily been slow, as no hydraulic data were available regarding the tracts in question and such data had to be collected before definite schemes could be formulated. Four minor projects however have been approved and their construction will be begun when funds become available; several others, of which some are of considerable magnitude, are still under investigation.

21. The care and maintenance of embankments form a not inconsiderable portion of the work of the Irrigation Department. Such embankments are of two kinds, those designed to exclude salt water and tidal waves from land situated in estuaries or on the sea face, and those constructed as a protection against river floods. Most of these embankments are situated in the districts of Burdwan, Hooghly, Midnapore and the 24 Parganas; apart from these there are a few lengths in Nadia, Murshidabad and Tippera, and on the north bank of the Ganges. This is not the place at which to discuss whether these works are beneficial or the reverse; the fact must be faced that so long as they exist any breach in them may result in dire disaster to the countryside. Some 1,500 miles of embankment are in the charge of the department; throughout the monsoon they are a source of continual anxiety to the officers responsible for them while during floods they absorb those officers' attention to the exclusion of almost all other matters.

22. A considerable amount of work also falls on the department in connection with the prevention of the construction of unauthorised embankments in areas in which such embankments are prohibited under the Embankment Act. The discharge of this duty necessitates frequent patrolling of the areas in question, followed often by lengthy proceedings in court.

23. Many other problems connected with control of and protection against floods, such as the making of leading cuts for the improvement of the outfall channels of rivers, the construction and maintenance of revetments to prevent erosion and protect areas or towns threatened by river action and the examination of reclamation schemes in tidal areas fall within the sphere of the Irrigation Department and constitute further demands upon the time and attention of its officers.

24. Another very important function of the department is the improvement of water-logged areas. The method usually adopted is to regulate the discharge of the areas in question, the works being so designed that, while draining away the surplus water, they submerge as large an area as possible, thus destroying the breeding grounds of the anopheles. A number of such drainage schemes has already been carried out, but the work has for the most part been concentrated in the vicinity of Calcutta. Indeed, the drainage of the 24 Parganas on these lines has been practically completed; in this area is situated the largest project of this kind, the Magra Hat drainage scheme, which affects 280 square miles.

25. A different problem arises in parts of the Malda and Rajshahi districts, where the floods are so heavy as to prevent cultivation during the monsoon but recede so quickly that no water is left available for cold weather irrigation. This problem is now being examined and its solution sought so far as the exiguous staff of the department permits.

26. The revival of dead rivers is another matter which falls within the scope of the department's work. We shall have reason to allude to this question in more detail later in our report; for the moment it will suffice to say that it is one of the first magnitude demanding long and detailed investigation. Up to the present but little has been attempted in this connection; the only works of the kind in operation are two small schemes, the Gobra Nala and Bhairab projects, which were opened last year in the Murshidabad and Nadia districts with the object of flushing dead rivers with water from spills of the Ganges.

27. The last main division of the Irrigation Department's work is that connected with navigation. The maintenance of the navigable waterways of the province is a matter of vital necessity; without them, trade would come to a standstill. The main rivers are used by inland steam vessels, with which a very extensive transport service has been built up; the principal marts lie on the river banks, and are connected with the interior by a vast ramification of smaller *khals*. Large fleets of country boats ply both on the *khals* and on the rivers themselves. There are 20,000 miles of navigable waterway in Bengal, excluding the smaller

khals, and upon the proper conservation of this system the economic life of much of the province largely depends.

28. The Irrigation Department has, in the past, occupied itself mainly with the maintenance and improvement of the principal through routes. A system of locked canals, giving access to the Hooghly at one end and to the so-called boat route to Barisal at the other, has been constructed and both canals and route are maintained by the department. The steamer route between Calcutta and eastern Bengal is also maintained in navigable condition, the Sundarbans and other channels are dredged, when necessary, and some years ago the Madaripur Bil route was constructed which, by affording a direct connection between the Madhumati and Kumar rivers, has greatly shortened the voyage between Calcutta and Assam. In some cases as on the Ganges, Mahananda and Dhalowari the maintenance of the main rivers in navigable condition has been entrusted to the Joint Steamer Companies, who are given a contract based upon their actual expenditure and carry out the work on behalf of the department.

29. From the foregoing brief summary it will be seen that the work of the department is at present largely localised. Irrigation entirely, and embankment and drainage work to a great extent, are concentrated in the western districts. In so far as waterways are concerned, the work extends throughout the province but it is confined for the most part to the through routes for both boats and steamers.

Chapter IV.

The need for development.

30. Having dealt with the work which the Irrigation Department actually performs we come now to the additional duties which, in our opinion, it should undertake. We desire, at the outset, to make it clear that this chapter is not to be read as imputing negligence or inactivity to the department as at present constituted. On the contrary, as we have explained in our general review of the position, we have been much impressed by the wide range of problems with which the department is called upon to deal, the efforts which have been made to solve them and, despite the handicaps to which we shall subsequently refer, the not inappreciable degree of success which has been achieved in various directions.

31. Again taking the four branches of the work of the department in order, we have already explained that the Government irrigation works in Bengal are confined to a few districts in the west of the province. In the past it seems to have been assumed that, because Bengal is in general a country of fairly copious rainfall, irrigation is of little value. But this assumption ignores the fact that the rainfall in question, while undoubtedly high, is liable to serious seasonal fluctuations. Rice is the most important food crop in Bengal, and to rice beyond all other crops a deficiency of water at the critical periods of its growth spells failure. It by no means follows that

because the total precipitation is normal a bumper crop will be obtained; unless the rain is received exactly when required damage will result which cannot be made good by additional supplies thereafter. We were informed by the officers of the Agricultural Department that the exact distribution necessary to produce a full crop is only experienced about once in ten years and that in other years the outturn will be less (in some cases greatly less) than the full obtainable yield. The loss to western Bengal owing to unfavourable fluctuations of the rainfall must be enormous and it is difficult to believe that, in such circumstances, artificial irrigation, designed to obviate corresponding fluctuations of the water-supply to the crops, would not be of great benefit, even apart from the manurial value to the fields of the silt-laden water which would, whenever possible, be utilised for the purpose.

32. Throughout our tours except in eastern Bengal, we have encountered demands for the investigation of the possibilities of a further extension of irrigation, using the word in a limited sense as excluding inundation from the main rivers, a separate question to which we shall have occasion to refer later. We consider that these demands should be met. It is hardly too much to say that most of the province, viewed as a field for [the extension

of irrigation, is at present an unknown land to the department. There has been no staff to obtain data but from what we have been told it seems likely that in some parts at least, including certain of the districts of northern and western Bengal which are peculiarly liable to failure of crops, water now runs to waste which could be beneficially used either directly or by means of works designed to store it at times of flood for utilisation during periods of scarcity. The districts of Malda, Dinajpur and Rajshahi are cases in point; the country in question is difficult but the difficulties do not appear to be insurmountable. In eastern Bengal it is possible that there may be scope for irrigation works, on the lines of the small experiment which is now being conducted jointly by the Agricultural and Irrigation Departments at Chandanta on the Meghna, for the irrigation of *boro* paddy with water pumped from the rivers during the cold season. There is also a demand for small schemes to irrigate from the *nalas* which cross the district of Chittagong.

33. The point which we particularly wish to make in connection with irrigation is that, at present, no data exist over most of the province to show whether or not an extension of it is technically or economically possible. This question can only be answered when a complete hydraulic and agricultural survey has been made of the districts concerned, a survey which will include an investigation into the extent to which water is available for the purpose. We are, however, satisfied that there is ample justification for such a survey, and that its execution should be regarded as an essential part of the duties of the Irrigation Department, working in close collaboration with the Agricultural Department. The survey will show whether it will or will not be possible to extend the benefits of irrigation to tracts which do not at present enjoy them; there are grounds for hope that, as an outcome, some suitable schemes at least will be discovered in the same way as the formation of the Bankura Division has brought to light possibilities of projects, some of a very promising nature, in a large area which had previously been neglected in this respect.

34. As regards embankments, it is doubtful whether there is any more serious or difficult problem in the whole realm of civil engineering than that which is presented by a deltaic country, the rivers of which have, by the construction of embankments, been robbed of the possibility of discharging their natural function of land formation. The rivers of Bengal, in their passage to the sea, carry vast quantities of sediment, but their slope through the delta is too small to generate the velocity necessary to transport it. It must inevitably be deposited somewhere. In normal circumstances it would be carried by the floods over the surface of the country, which it would at once raise and enrich. But in Bengal, as in many other parts of the world, embankments have been erected along the banks of certain rivers to protect the neighbouring land from flooding. This policy of the predecessors of the present generation of engineers has handed down to the latter problems of a most complex and difficult nature. One of the most important of these problems is to be found in the embankments of the

Damodar river. These were constructed at the beginning of last century; eighty years ago the engineers, alarmed by the rise in the river levels, demolished 20 miles of the right embankment and 10 more miles were demolished forty years later. The policy of demolishing one embankment only is obviously wrong and its effect cannot be more than purely temporary. Silt has been allowed to deposit on the exposed side with the result, it is stated by the engineers in charge, that the land on the right bank has on an average risen to a level nearly nine feet higher than that on the so-called protected side, which has, at the same time, been impoverished by the denial of fertilising silt. Both the land on the right bank and, more important, the river bed are said to be rising steadily at the rate of about an inch a year, the protected country on the left bank, including the town of Burdwan, falling relatively to them at the same rate. The protective embankment on that side was raised by three feet between 1914 and 1919 and proposals for raising it still further are now under consideration.

35. We have no hesitation in saying that, if the facts are as represented to us and unless a new policy is adopted, a calamity is bound eventually to occur. In 1913 a flood burst the left bank and spread disaster over a large area. Since that year both the bed of the river and the right bank have risen and the embankments on the left bank have been raised. As the levels rise, the extent of the ultimate disaster grows; any policy directed towards holding the embankments intact merely has the effect of passing it, in a magnified form, to the next generation.

36. We have mentioned the Damodar embankments in particular as being the most striking example which we have seen but the problem arises elsewhere in various degrees; indeed the difficulties which arise in consequence of the marginal embankment of the Damodar are intensified by the network of similar works which protect the country lower down from flood, at the same time obstructing the free escape of the Damodar water. Once more it is, of course, impossible for us on the data available to suggest exactly where the solution lies, whether in the further removal of embankments, in the construction of escapes or sluices in them, in the improvement of the outfall channels by means of leading cuts or in the clearance of obstructions to the free runoff of the floods. It would, on the face of it, appear that the construction of extensive escapes at the position of former natural off-takes, coupled, where possible, with the clearance of obstructions, would make for immediate improvement. A close study of all the conditions will be necessary before any final policy can be evolved, but we are not prepared to believe that a reasonably satisfactory solution is beyond the powers of modern engineering skill.

37. It is, of course, of the utmost importance to any policy directed towards the mitigation of the effects of embankments built in the past that no further works of the same kind should be constructed without full consideration of their possible result. There are many areas, notified under the Embankment Act, in which the construction of such works and interference of any kind with the natural drainage of the country are prohibited. We

have, however, learnt from the officers of the department that, on account of shortage of staff, they are not in a position to keep an adequate watch over these areas, which are very extensive, and that it is quite possible for interference to take place without their knowledge. We consider that steps should be taken to remedy this defect; it is useless to remove obstructions at one point if, simultaneously, new obstructions are being raised at another, unknown to the controlling authority.

38. Turning now to the subject of drainage, we have already mentioned that a number of schemes for the relief of water-logged areas have already been carried out in the neighbourhood of Calcutta. A considerable amount of work of the same nature still remains to be done, more particularly in the tidal tracts on the western bank of the Hooghly, where the reclamation of salt swamps has led to the rapid deterioration of the drainage channels, resulting in water-logging of the interior. But the most serious problem, and one of which up to date only the fringe has been touched, is that presented by the dead and dying rivers of central Bengal, especially in the Murshidabad, Nadia, Jessore and Khulna districts.

39. Here again there is urgent need for the formulation and prosecution of a definite policy. The only pronouncement by Government on the subject which we have been able to discover is a resolution issued in 1907 endorsing the findings of the Drainage Committee of the Presidency Division. This Committee had then just reported that it was inexpedient to attempt action designed to reopen at their heads rivers which from natural causes had closed and no longer conveyed through their channels the water of larger streams once distributed by them. We were told by Mr. Addams Williams that this resolution no longer represents the views either of the present Government or of their present technical advisers, but there is nothing on record to show in what direction or to what extent it requires amendment. It would, we consider, materially advance the cause of drainage work in the province and clear away any misconceptions which may still exist were Government, in consultation with their advisers on hydraulic and public health questions, to revise their resolution and formulate a definite policy to be followed in the future.

40. Before, however, such action can safely be taken, a complete hydraulic survey of the rivers in the districts in question is required, as is also a contoured map of the portion of them through which the Nadia rivers flow. There is grave danger in dealing with questions of this nature piece-meal; the problem of drainage in central Bengal must be regarded as a whole. It is only when a comprehensive survey is available that it will be possible to say exactly what remedial measures are necessary and how far they are practicable. On the information before us we are inclined to think that the only solution will be found to lie in flushing these dead rivers and, so far as may be possible, the country on their banks, with silt-laden water from the Ganges and its effluents during the monsoon, and we are therefore not prepared to endorse the findings of the Committee to which we have referred that action to this end would be inexpedient.

It will undoubtedly be a troublesome and expensive matter but on the face of it it does not appear that there are any greater natural obstacles in the way of such a course than those which have to be overcome in keeping open the great inundation canals from the Indus, a deltaic river comparable in size to the Ganges and not unlike it in some general characteristics such as its tendency to wander throughout a wide trough.

41. Central Bengal is, at present, a decadent tract; it is highly malarious, the population is steadily decreasing, and the land is going out of cultivation. It may, of course, be the case that deterioration has already proceeded so far that it cannot now be checked and that the tract in question is doomed to revert gradually into swamp and jungle; but we are strongly of the opinion that before so gloomy a view is taken a thorough investigation should be made of the possibility of remedy. The prospect of at least a partial restoration of the rivers proving feasible seems to us to be sufficiently good amply to justify the expense of a comprehensive survey, such as we have recommended, which will enable the problem to be reviewed in all its bearings. Without such a survey, any measures adopted in particular areas are likely to prove but temporary palliatives, liable to failure owing to their not being connected with any scheme for the improvement of the river system of the area as a whole.

42. There are other drainage problems which await the attention of the department, for the investigation of which no staff is at present available. It is a matter of great importance that such problems should be dealt with as they arise, since any delay is likely to increase the difficulties to be overcome, and for this purpose hydraulic data should be collected for all important drainage lines. In the interests both of agriculture and of sanitation, observations ought to be available sufficient to enable a definite decision to be given as to the adequacy of the waterways allowed both in railways and in roads.

43. Coming lastly to navigation, we have already stressed the importance of the maintenance of the navigable waterways to the economic life of the province and have explained that in the past the activities of the department have been directed primarily to the upkeep of the main routes both for boats and steamers. This work has, however, been seriously hampered both by shortage of staff and by financial stringency. It has been represented to us that cases have arisen where dredging was urgently required but where it was impossible to commission the expensive dredgers maintained by the department owing to the lack of budget provision to man and work the vessels. As regards the revival or maintenance of minor routes, giving access between the interior of the country and the main rivers, practically nothing has been done, with the result that, in some parts of the province at least, channels have been silted up, navigation has become limited to a few months in the year, and crops can only be marketed when the *khals* rise high enough in the monsoon to make transport possible. There is a general feeling that the waterways are not maintained in the efficient state which their importance demands, that their interests are not sufficiently

safeguarded as compared with those of other transport systems, and that, in particular, local interests are neglected. There is, in our opinion, considerable justification for this feeling; the

staff is not adequate to investigate complaints or ascertain requirements, and even when schemes are prepared and approved funds to carry them out are not available.

Chapter V.

The present organisation of the Irrigation Department.

44. Prior to the year 1921, there was no separate organisation in Bengal charged with the duties referred to in the preceding chapters, all public works within the Presidency, whether hydraulic works, buildings or roads, being entrusted to the care of a single establishment. This system, which rendered specialisation almost impossible, had long proved unsatisfactory; with the division of control between the reserved and transferred halves of the Government, which resulted from the introduction of the Reforms, its disadvantages became even more marked and, in May 1920, the Local Government addressed the Government of India and put forward a proposal for the creation of a separate department for the charge of hydraulic works. This proposal was sanctioned by the Secretary of State in December of that year.

45. The proposal, as originally put forward and sanctioned, visualised the partition of the province into four circles of superintendence, the Western, Southern, Waterways and Dacca Circles, each to contain three executive divisions. The Western Circle was to comprise the Damodar, Cossye and Hijili Divisions. Of these, the Damodar Division was to undertake the work previously in the charge of the old Northern Drainage and Embankment Division, with the exception of that of the Magra Hat and Diamond Harbour subdivisions on the east bank of the Hooghly. The difficulties of the problems involved in the maintenance of the Damodar embankment and the disposal of the flood water of the Damodar and Ajai were considered to be so serious as amply to justify this reduction. The Cossye Division was also to be reduced to the area which it had occupied prior to the separation of Bengal; with the transfer of the Balasore district to the newly formed province of Bihar and Orissa, the major portion of the old Balasore Division had been added to the Cossye Division, making it a heavy and unwieldy charge. It was, therefore, proposed to constitute a new division, the Hijili Division, to undertake the work in the latter area. "The necessity for carrying out urgent works of drainage and for investigating problems of flood drainage within this area," reported the Chief Engineer in 1920, "is very well known to all civil officers and officers of the Public Works Department in Bengal. These problems have never been tackled with that seriousness which is now demanded, and although it would appear on the map that the Hijili Division will be a very small one, yet, in point of fact, there is ample work for one Executive Engineer."

46. The Southern Circle was to consist of the Calcutta Canals, Jessore and Nadia Rivers Divisions. The Calcutta Canals Division was to include the canalised *khals* near Calcutta,

Tolly's Nullah, and the boat routes to Kulti, with the addition of the Magra Hat and Diamond Harbour subdivisions, to which reference has already been made. The Jessore Division was to take over the whole of the drainage system between the Padma on the north and the Bay of Bengal on the south, a tract which includes some of the most malarious areas in Bengal. The Nadia Rivers Division was to include all irrigation works lying within the districts of Murshidabad and Nadia, as well as the whole of the conservancy works of the Ganges from Rajmahal to Goalundo.

47. The three divisions proposed in the Waterways Circle were the Grand Trunk Canal, Khulna and Dacca Navigation Divisions. The Grand Trunk Canal project had just been sanctioned and the maintenance of the canal was to be assigned to the Grand Trunk Canal Division in which was also included the charge of the dredging fleet. The Khulna Division was to deal with the whole system of waterways leading from eastern Bengal through the Sundarbans to Calcutta, and the Dacca Navigation Division with all waterways north of the Padma within the districts of Mymensingh, Dacca, Tippera and Noakhali. It was intended that the jurisdiction of the Waterways Circle should thus be roughly identical with that which would be assigned to a self-contained River Communications Board, in the event of such a Board being constituted in future.

48. Lastly, the Dacca Circle was to be created in order to extend the operations of the department into areas which, up to that time, had received little or no attention. For this purpose it was proposed to constitute three divisions primarily for drainage and flood protection work, one in the Dacca and two in the Rajshahi Commissioners' Divisions.

49. For several reasons effect has never been given to the sanctioned proposal. Shortage of establishment, uncertainty as to the fate of the Grand Trunk Canal project, and, above all, financial stringency have militated against the expansion of the department. Actually there are, at present, two circles and eight divisions in operation in Bengal. Of these eight divisions, two are employed upon work which was not included in that for which the establishment sanctioned in 1920 was proposed; the Bankura Division was formed in 1926 to meet a demand for irrigation from the rivers flowing into Bengal from Bihar for which no provision existed in the sanctioned scheme, and the Damodar Canal Division for the construction of the Damodar Canal, which has been sanctioned since 1920. Of the remaining six divisions, the Damodar, Nadia Rivers and Calcutta Canals Divisions have been formed broadly on the lines originally proposed. The Cossye Division continues to be overloaded with the work for

the execution of which the Hijili Division was to be formed. Two divisions, the Khulna and Dredgers Divisions, operate in the area which was allocated to five divisions, namely, the Grand Trunk, Jessore, Khulna, Dacca

Navigation and Dacca Drainage Divisions. The two divisions in the Rajshahi Commissioner's Division have never been formed and a single subdivision of the Nadia Rivers Division is now operating in that area.

Chapter VI.

The need of a separate organisation for waterways.

50. From the descriptions which we have given of the work which lies before the department and of its present strength it will be clear that a complete reorganisation will be required before it will be in a position to discharge the duties which should devolve upon it.

51. We have considered at length what form this reorganisation should take and have come to the conclusion that the work is too great and too varied for one department, even if that department be strengthened, and that it must be distributed between two separate establishments and not be entrusted to a single department as at present. A proposal to this effect was made by the Royal Commission on Agriculture in India and in the course of our enquiry we have found that this proposal has wide support. It is in the first place clear that the amount of work which has to be done is such that it will be impossible for a single departmental head to give to the individual questions which will arise the detailed attention which they deserve, and at the same time carry out all the other duties involved in the control of the department. It is true that this difficulty might be met by dividing the work between two Chief Engineers, but for administrative reasons such a division of responsibility within one department creates difficulties, which in Bengal would be enhanced by the diversity of the work in different parts of the province. In the second place this same diversity of work demands a greater degree of specialisation than is now possible. The kinds of work which, under existing arrangements, fall to the lot of the department are so varied that no man can be expected to be an expert in them all. Indeed, if the scope of the department's activities were enlarged, as we have suggested, and if the various problems facing it were seriously tackled, specialisation within the department would almost inevitably lead to some form of internal separation, even if only one establishment were maintained. It is too much to demand of any man that he shall become master of no less than four distinct branches of hydraulic engineering, all of extreme complexity, and there would be a tendency to employ officers on those branches, of which they had made a special study. Apart from the fact, which in itself is not unimportant, that such specialisation among the officers of one department leads to difficulties in matters of appointments, such as the selection of the head of the department and promotions to the higher posts, the interest of the work and of the province will be better served if specialisation is collective rather than individual. These difficulties will be avoided and a healthy specialisation secured if part of the Irrigation Department's duties is transferred to a separate organisation.

52. There is another reason for thinking that such a separation of functions would be beneficial. At present all expenditure, no matter upon which branch of the department it is incurred, is budgeted and accounted for under a single major head. There is a feeling, more particularly in western Bengal, that navigation works obtain far more than their due share of the funds available and that the limited resources of the department are devoted primarily to defraying expenditure, such as that in connection with the maintenance of the dredging fleet, in which western Bengal is but little interested. It is also possible that the controlling authority may favour one branch at the expense of another, and, although we do not wish to suggest that this has been the case in the past, it is a contingency which should be guarded against. The point can, in our view, best be met by placing the activities of the department under different authorities, which would be separately responsible for justifying and obtaining finance for the works falling within their respective spheres.

53. To determine the best line of separation is by no means an easy matter and is one upon which various opinions have been expressed in evidence before us. After full examination of these views, we have come to the conclusion that the most efficient and convenient arrangement will be secured by placing the administration of irrigation, embankment and drainage work under one authority and that of navigable waterways (to which, for the sake of brevity, we shall refer hereafter as waterways) under another. We shall now explain the various considerations which have led us to this conclusion.

54. In the first place, separation on these lines will lead to the most economical territorial distribution of the work. Dealing in order with the four geographical divisions of Bengal, the potentialities of northern Bengal are almost unknown, but it is probable that the main problems which will arise will be connected with irrigation and drainage. In western Bengal irrigation, drainage and embankments are all of great importance, while in central Bengal drainage, if flushing be included in the term, is the predominant interest. In eastern Bengal fortunately, embankments are rare, and there is only one maintained by the Irrigation Department. There is at present little demand for irrigation and that only in limited areas. There is a demand for drainage, but this is chiefly for the restoration of old channels in order that water may flow and boats may pass. Navigation is the subject upon which attention is mainly focussed. A separation between waterways on the one hand, and irrigation, embankments and drainage

works on the other, will result in two organisations one of which will be mainly concerned with eastern Bengal and the other with the rest of the province. Any other distribution would lead to a much more serious overlapping of jurisdictions. There is very little scope for navigation work in western Bengal, and it would be as incongruous to employ in that area an officer who had specialised in waterways as it would be to employ in eastern Bengal an officer who had specialised in irrigation and embankments.

55. The only question which really arises in this connection is whether drainage should be classed with irrigation and embankments or whether it should be included with waterways. It seems to us obvious that any separation between embankments and drainage is impossible and that, where both exist in the same area, they must be dealt with as part and parcel of a single problem. The combination of irrigation and embankments practically demands, therefore, the addition of drainage. We have considered the suggestion that the line of division between the two departments might be partly territorial, and that drainage should be combined with irrigation and embankments in those parts of the province where these are important and with navigation where water-borne traffic is the chief element to be considered. A consideration of the needs of central Bengal, however, will show the difficulty of saying where the line should be drawn, and we have come to the conclusion that drainage throughout the province should remain with the department which deals with irrigation and embankments. It is desirable that the drainage of Bengal should be studied and dealt with as a whole by a staff which has specialised in the subject, and that the responsibility for it should not be divided among different organisations. It is also of importance to remember that drainage works are regulated by the same legislative enactments as regulate irrigation and embankments, and that it might well prove inconvenient to have two different authorities administering the same Act.

56. We admit the close connection which exists between waterways and drainage, but the nature of this connection is not such as, in our opinion, to make it necessary for both to be dealt with by the same department, provided that there is reasonable co-operation between the authorities responsible for the two subjects. In general, any improvement of a waterway will tend also to improve drainage, while the

improvement of a drainage channel will often mean the improvement of facilities for navigation on it. In such cases, the two authorities must co-operate and share the expenditure, the actual execution being undertaken by the one most interested or most conveniently situated for the purpose. There may, however, and probably will be other cases, as for example if it were proposed to carry a locked canal across the drainage of the country, in which conflict will arise between the two interests. In such cases it is desirable that the one authority should serve as a check upon the other. We consider that the interests of drainage which, in view of its effect upon the public health, is of predominant importance, will best be safeguarded by placing drainage and waterways under separate control, the Local Government acting as the final arbiter when the views of the two controlling authorities clash.

57. There is one further reason for the line of separation which we have advocated. As we shall explain later in this report, we are not satisfied that the present system of administration of the waterways is that best adapted to secure their proper development; we consider that a more suitable arrangement will be to transfer this administration to an organisation upon which the interests both of commerce and of the public who use the waterways will be represented. The activities of such an organisation will have to be financed, to a great extent, by the levy of surcharges, tolls or fees on the traffic carried. This organisation and method of finance, while suitable where waterways only are concerned, would be unsuitable if drainage also were involved. An authority, constituted as suggested, would have little or no direct interest in agricultural or anti-malarial schemes which in no way increased navigational facilities, nor would it be fair to tax navigation in order to provide funds for drainage projects which afforded no benefit to transport. We think that in the administration of the waterways it will be both possible and desirable to introduce direct representation of commercial and local public interests, but it would not be easy to find representatives who would be equally fitted to deal with both waterways and drainage. The responsibility, both administrative and financial, for the control of drainage rests with Government and under the law is exercised through the agency of Collectors and other officers of Government; it would be neither proper nor expedient for Government to share this responsibility with another authority.

Chapter VII.

The reorganisation of the Irrigation Department.

58. The transfer of the navigable waterways to a separate authority will undoubtedly relieve the staff of the Irrigation Department of a material portion of the work which at present devolves upon it. But, even after allowing for this relief, a considerable augmentation of its strength will be required before it will be in a position to deal, in the way which its importance demands, with the work which will still remain in connection with irrigation, embankments and drainage. We propose therefore in this chapter

to put forward certain recommendations as to the lines upon which the necessary reorganisation of the department should be effected.

59. We have had, in the first place, to consider whether any further subdivision of the subjects remaining with the department would be advantageous, and more especially whether irrigation should be separated from drainage and embankments. It has been suggested to us that difficulty is experienced if a single divisional officer is made responsible for both

irrigation and embankments, because both embankments and irrigation channels require the most careful supervision at the same time of the year, before and during the floods, but the fear of disaster compels the divisional staff to devote its whole attention to the embankments, at the expense of irrigation. Moreover, the interests of irrigation and of drainage are by no means always identical, and it may be argued that those of the latter would be better safeguarded were they entrusted to an officer other than one responsible for the preparation of irrigation projects.

60. While admitting the force of these arguments, we do not consider that they are sufficiently strong to justify the overlapping of charges and duplication of staff which a further separation of functions within the department would necessarily entail. In prescribing the limits of subdivisions it will certainly be desirable to ensure that, so far as may be possible, no subdivisional officer who is in charge of irrigation shall also be responsible for embankments and *vice versa*, but we would not carry the principle so far as to apply it to divisional charges. The second point urged, namely, the securing of the claims of drainage against those of irrigation, can best be met by the appointment of the special drainage officer to whom we shall refer later in this chapter.

61. For reasons which will be clear when we come to discuss the relations between the Irrigation Department and the district authorities, it seems to us very desirable that in any scheme of reorganisation the boundaries of the various charges should, so far as possible, be fixed so as to coincide with those of the various civil districts and divisions, and the scheme which we recommend for adoption is framed on these lines. Some rectification may, of course, prove necessary if a district boundary cuts some particular hydraulic problem into two parts, but delimitation by districts will be found generally suitable.

62. Dealing first with administrative charges, the head of the department will, as at present, be the Chief Engineer, and to him will be attached a personal assistant of the rank of Executive Engineer. For purposes of more detailed administration, the province will be divided into three circles of superintendence, each in charge of a Superintending Engineer, the Western Circle covering the Burdwan Commissioner's Division, the Central Circle covering the Presidency Commissioner's Division, and the Eastern Circle covering the Commissioners' Divisions of Rajshahi, Dacca and Chittagong.

63. The Western Circle will consist of four divisions, the Hijili, Cossye, Damodar and Damodar Canal Divisions. The present Cossye Division is an impossibly large charge and effect should, we consider, be given to the proposal sanctioned in 1920 for its partition. The Midnapore district should be split into two divisions, the Hijili Division in the south and the Cossye Division in the north. The desirability of keeping the working of the new Damodar Canal and of the Eden Canal, which will be fed from it, in the hands of a single division, makes it impossible to regulate according to district boundaries the limits of the Damodar Canal Division, which will be

formed as soon as the construction work is finished; this division should include so much of the Burdwan and Hooghly districts as is commanded by the two canals and also the Birbhum district to the north of this area. The Damodar Division will be in charge of the rest of the Burdwan and Hooghly districts and of any works in Bankura and Howrah.

64. We are convinced that the importance of the problems, and more especially those in connection with embankments and drainage, which confront the Irrigation Department in the Burdwan Commissioner's Division, fully justifies the creation of four permanent executive divisions in this area and that it would be impossible with less staff to give these problems the attention which they merit.

65. The Central Circle will consist of three divisions, the Nadia Rivers, 24-Parganas, and Jessore Divisions. The Nadia Rivers Division will include the districts of Murshidabad and Nadia, the Jessore Division those of Jessore and Khulna, while the 24-Parganas Division will operate in the district of that name. Many of the most important dying rivers of Bengal lie within this circle and here again the establishment proposed cannot be regarded as in any way extravagant if regard be had to the complexity and importance of the issues involved.

66. The Eastern Circle will also consist of three divisions, one each in the Commissioners' Divisions of Rajshahi, Dacca and Chittagong. The Rajshahi Division will include the districts of Darjeeling, Jalpaiguri, Malda, Dinajpur, Rangpur, Rajshahi, Bogra and Pabna, the Dacca Division those of Faridpur, Bakarganj, Mymensingh and Dacca, and the Chittagong Division those of Tippera, Noakhali, the Chittagong Hill Tracts and Chittagong. The areas of these divisions will be considerable, but little is known as to the work which will be forthcoming in each and, until the field of work has been further explored, we do not feel that we should be justified in recommending the appointment of a larger staff. The divisions in question should be further subdivided as and when the work necessitates an increase. As the three Commissioners' Divisions are at present covered by one Irrigation Department subdivision north of the Ganges, and by one division at Khulna, and the latter is mainly occupied with navigation work which, under our scheme, will be transferred to a separate authority our proposals constitute a material advance upon the existing position.

67. Besides the ten divisions which we have recommended, the Bankura Division should continue in existence until the investigation work upon which it is now employed is completed and the construction of the Damodar Canal is finished. It will then be disbanded and the results of the investigation handed over to the Northern Division in so far as they relate to schemes in Malda and to the Damodar Canal, Damodar and Cossye Divisions in so far as schemes in Bankura, Burdwan and Midnapore, respectively, are concerned.

68. In addition to the organisation which we have suggested above, one further and important appointment is, in our opinion, required, namely, that of a Special Drainage Officer. The work of this officer, who should have the status of a Superintending Engineer,

will extend throughout the whole province; he will make a special study of the drainage problem and upon him will devolve the primary responsibility for seeing that, in any projects which are put forward, whether for navigation, reclamation, irrigation, roads or railways, the interests of drainage are adequately safeguarded. To enable him to discharge this function, all such projects will be sent to him for examination by Superintending Engineers before being submitted to the Chief Engineer. The Special Drainage Officer will tour throughout the province, keeping in close touch with the Chief Engineer on the one hand and with the circle and divisional officers on the other; he will have little or no office or routine work and will thus be in a position to devote to drainage problems a concentrated attention which cannot reasonably be expected from the regular officers of the department, who must necessarily be occupied in many other directions. It will be his duty to initiate schemes for the improvement of drainage, to discuss them with the officers responsible and, if necessary, to criticize drainage projects put up by them, to co-ordinate the work of the various circles in so far as drainage is concerned and generally to ensure that this side of the work of the department is given the consideration which it deserves. He will be the Chief Engineer's right-hand man and should obviate much of the delay which must necessarily occur if the head of the department in addition to his many other duties, has to see that in every project submitted the claims of drainage

are safeguarded against those of other interests, and that individual drainage schemes, prepared possibly in different circles, are properly co-ordinated. Our colleague, Mr. Smith, has brought to our notice the excellent results achieved in the Punjab by the appointment of such an officer to deal with the water-logging problems which have lately assumed serious proportions in that province, and we are convinced that a similar appointment would be of equal value in Bengal.

69. Our proposals thus contemplate the creation of sixteen permanent superior posts in the Irrigation Department in Bengal, one being of the rank of Chief Engineer, four of the rank of Superintending Engineer and eleven of the rank of Executive Engineer. While constituting a considerable increase over the existing staff it is in our opinion the least establishment with which the necessary work can be properly performed. The reorganisation of the department sanctioned in 1920 provided a Chief Engineer, three Superintending Engineers and ten divisional posts primarily or entirely for irrigation, embankment and drainage work; we are suggesting the addition of only two posts, one of which will be held by the Special Drainage Officer, while one is accounted for by the addition to the work of the department caused by the construction of the Damodar Canal, which was not in existence when the scheme of 1920 was framed. We are thus doing little more than advocating that effect be given to a reorganisation already sanctioned and already ten years overdue.

Chapter VIII.

Proposals for revising the procedure for improvement schemes.

70. The existing staff of the Irrigation Department is so small that it is not surprising to find that there are several districts in which the local authorities are not in touch with any officer of the department and the department itself is regarded as beyond the influence of public opinion. We have found a general wish, which is shared by the Chief Engineer and his officers, that closer relations should be established between the department and local authorities and in our opinion unless this is effected reorganisation will not be complete. The increase of staff which has been suggested will facilitate this, but it is also necessary to have some arrangement by which the Executive Engineers may be kept in touch with and help in forming opinion in the districts, and by which also district opinion may be brought more directly to the notice of Government. It is further necessary to find remedies for the difficulties of finance and procedure which now block the progress even of schemes which have been prepared by the department and have received the administrative approval of Government. An example is furnished by the scheme to re-open the Alaipur Khal in Khulna district, a productive scheme estimated to yield a profit of eight per cent. This project received the administrative approval of Government more than three years ago, but has remained at that stage owing to the fact that Government have been unable either to find the funds to carry

out the work or to finance the expansion of staff without which the department cannot take it up. The financial difficulties of Bengal seem hardly a sufficient explanation of the failure to proceed with a scheme giving so good a return on the capital cost, and we strongly recommend that every effort be made in future to obtain additional loan funds for the financing of projects of this nature.

71. The difficulties of procedure are most marked in the case of schemes of improvement, generally involving the opening out or clearance of water channels, for which there is so large a demand in Bengal. Under the existing law such schemes, provided they include the improvement of agriculture or drainage, are to be carried out under the Bengal Agricultural and Sanitary Improvement Act, 1920. With a few exceptions, the general opinion, both official and non-official, is that this Act is difficult to work, and there is little doubt that the obstacles it presents and its complicated procedure have produced a reluctance to make use of it. An examination of its provisions and of the rules made under it shows that there is good reason for such reluctance, but a still stronger ground for criticising the working of the Act is the fact that, since it was enacted in 1920, only four projects have been carried out under it, although a very considerable number have been prepared.

72. The main difficulties in working the Act appear to have been the following :—

(1) In the initiation of schemes, there has been delay in preliminary investigation and difficulty about finding the money for the survey and preparation of projects. The first is largely due to lack of staff, which will be remedied if the staff is expanded as we have proposed. The second has been partly solved by a small grant placed at the disposal of the Chief Engineer; with this he can finance the preparation of schemes which are reported to be worth investigation, but we have been told that there is still delay in sanctioning such expenditure.

(2) The provisions for the consideration of schemes by the Collector, the appeals to the Commissioner, and in the case of "major" schemes the appointment and proceedings of a special committee, afford great opportunities for delay.

(3) When schemes have been prepared there is often much delay over references to various departments interested and there has been a lack of co-ordination between these departments. A scheme designed to improve sanitation and agriculture by the control of flood and drainage, after preparation by the Irrigation Department, has to be referred to the Public Health and Agricultural Departments, and also to the Finance Department if it is proposed to spend provincial funds on the scheme. It sometimes happens that considerable time is lost owing to discussions as to which department should take up the scheme. For instance, a scheme estimated to cost Rs. 1,590, which was submitted to Government in October 1923, with the request for a grant of Rs. 500, remained with Government till June 1925, mainly owing to the cause just mentioned. The division of responsibility has made it difficult to deal with schemes promptly and energetically.

(4) The question of financing the execution of schemes has proved a serious obstacle. When the Act was first passed, the view taken by Government seems to have been that the funds should be advanced by local authorities. It was found, however, that it was not lawful for District Boards to spend money on agricultural schemes, and that they were unwilling or unable to provide funds for sanitary schemes; and in recent years Government have usually accepted the responsibility. It is, however, still necessary for individual projects to take their chance of inclusion in the budget and this may be a substantial obstacle.

(5) The estimates of cost prepared by the Irrigation Department include charges of 2½ per cent. for establishment, 1½ per cent. for tools and plant and 1 per cent. for audit; they also include the capitalised cost of maintenance. As one Collector has put it, applicants for small schemes are often staggered by the resulting estimates.

(6) The number of schemes which have reached the stage of apportionment of costs is so small that it cannot be said that the procedure for apportionment has been an obstacle. But the elaborate nature of the prescribed procedure and the fact that no recovery has yet been made in the case of the two schemes, which were completed in the Chittagong district in 1927, suggest the desirability of a simpler procedure.

(7) Of the provisions for the maintenance of works there has been no experience from which to judge. We wish, however, to draw attention to the danger involved in the provisions for the realisation of the capitalised cost of maintenance. The local Government or the authority or person in whom the works vest becomes responsible for the permanent maintenance of the works. A change in natural conditions may render such a responsibility either very costly or impossible of fulfilment. Further the capitalised cost of maintenance is necessarily based on present values, and increasing rates may render it inadequate. We regard it as very undesirable that such a responsibility should be imposed for more than a limited number of years.

73. The three main needs therefore are co-ordination of effort both in the districts and at headquarters, the ready financing of approved schemes and the simplification of procedure. The suggestions which follow are designed to meet these needs.

74. In our proposals for the organisation of a waterways authority we shall include a proposal that District Committees be formed to assist and advise in the case of waterways, and we suggest that these committees should also be used for the purpose of co-ordinating local efforts for other improvements, such as those for which Act VI of 1920 was intended to provide. For this purpose the Health Officer and Agricultural Officer of the district should be added to the committees, which would thus consist of—

The District Officer,
The Chairman of the District Board,
The Vice-Chairman of the District Board,
The Chairmen of the Local Boards,
The District Engineer,
The Health Officer,
The District Agricultural Officer,
The Executive Engineer, Irrigation Department,

and one or two representatives of towns, landholders, or other important interests, to be appointed by the Commissioner of the Division. A committee of this kind should effectively represent public opinion and be competent to advise on all schemes affecting the district.

75. We think that there should also be a Central Committee to assist the Minister who will deal with such schemes, and recommend that this should consist of—

The Chief Engineer, Irrigation Department,
The Director of Public Health,
The Director of Agriculture,
The Secretary, Local Self-Government Department,
The Secretary, Agricultural Department,
The Secretary or Deputy Secretary, Finance Department.

76. Schemes under Act VI of 1920 are at present dealt with by the Local Self-Government or Agricultural Department according to their nature; but if the committee we propose is formed, it will be better that it should work under one Minister. The department which frames rules under the Act is the

Local Self-Government Department; and it will be convenient if the committee works under the Minister-in-charge of that department, whatever the nature of the scheme.

77. The main object of the Central Committee is to eliminate the delays caused by inter-departmental references, and we do not therefore recommend the appointment of any non-official to it. It is proposed that discussion at a meeting of the committee be substituted for formal consultation of departments, and that the approval of the committee be regarded as sufficient authority for the Local Self-Government Department to go forward with a scheme. All schemes will be either referred to or received from District Committees, which will obtain opinions from local officers representing the three departments. Ordinarily these opinions, together with the report of the officer preparing the scheme, should be sufficient to enable the heads of departments to state at the meeting of the Central Committee whether they have any objection, and the committee will then be able to advise the Minister definitely whether or not the scheme should be sanctioned. It is proposed that a representative of the Finance Department should be on the committee in order that he may accord the concurrence of that department; if, on financial grounds, he is unable to do so, he should at once submit the case to the Finance Member. Similarly the Secretary of the Agricultural Department should have the right, in a case which is largely agricultural, to submit it for the orders of the Minister for Agriculture before final sanction is given.

78. For the ready financing of schemes we can see no alternative, if progress is to be made, to Government's advancing the cost of both the preparation of the schemes and the execution of the work, the funds being provided by borrowing from the Government of India. We are fully aware of the disabilities under which the province labours so long as the present financial settlement is in force, but we are unwilling to believe that its credit is not good enough to enable it to obtain the comparatively small amount of loan funds which would be needed or that, in view of the very real urgency of effecting improvement in the deteriorating tracts, the Government of India would view an application for such funds in other than a sympathetic spirit. A sufficient grant should be placed at the disposal of the Local Self-Government Department from which, with the approval of the proposed Central Committee, schemes may be financed without further reference to the Finance or other Department of Government. If a scheme is prepared but is rejected, the cost of preparation should be borne by Government, but we consider that ordinarily the cost of schemes actually executed, including the cost of their survey, should be paid by the people who are benefited. To avoid the delay which occurs where a contribution from provincial revenues is proposed, a small grant may be placed at the disposal of the Local Self-Government Department for exceptional cases.

79. For the reasons already stated the cost of maintenance in perpetuity should not be capitalised, and the estimate should provide only for maintenance for a limited number of years according to the nature of the work. The cost of maintenance for this first period of years

should be realised together with the cost of the work; it should then, if necessary, be revised and realised for another period.

80. In view of the fact that agricultural, sanitary and drainage schemes are ordinarily simple, involving more earth work than anything else, we recommend that the charge for establishment, tools and plant, and audit should be reduced to 10 per cent. of the cost of execution.

81. In view of the elaborate nature of the procedure for the apportionment of costs we should welcome a modification of those sections of the Act which require a meticulous distribution of the cost according to the degree of benefit obtained, which is clearly impossible to estimate when the benefit is sanitary. It has been suggested that, instead of the capital cost being recovered in a few instalments, as is contemplated under the Act, a cess should be levied at a flat rate upon the total area benefited; the cess might be so calculated as either merely to cover simple interest on the capital cost and the annual cost of maintenance, in which case it would be realised in perpetuity, or to include in addition an element for the creation of a sinking fund to liquidate the capital, in which case it would be reduced to the mere cost of maintenance as soon as such liquidation took place. The zamindar, in view of his special position under the Permanent Settlement, might be required to collect this cess together with the roads and public works cesses, or it might be collected by the union boards. The advantage of such a scheme would be the reduction of the initial cost to the smallest dimensions and the substitution of small annual payments for the larger instalments required by the present rules. The question however requires more consideration than we have been able to give it, and we put it forward as a suggestion which we recommend for further examination. It is in any event desirable that the provisions for apportionment and realisation should be made as elastic as possible in order that the procedure may be adapted to the requirements of each case. This is one of the matters on which the advice of the District Committee is likely to be valuable.

82. The present procedure can be greatly simplified by placing reliance on the District Committee. The procedure which we suggest is, briefly, that all proposals for works of improvement shall be referred in the first instance to the District Committee; the committee, unless it rejects the proposal summarily, will obtain from the Executive Engineer of the Irrigation Department his opinion whether the proposal is feasible and worth investigation and his estimate of the cost of preparing a scheme. The District Committee will then either reject the scheme or will forward it to the Central Committee through the Commissioner of the Division with their own opinion and the opinion of the Irrigation Executive Engineer and with a request that a detailed project for it may be prepared. The Central Committee will either reject the proposal or allot funds for the preparation of a detailed project. The Chief Engineer of the Irrigation Department will then cause a project to be prepared and sent to the District Committee. On receipt, the District Committee will either reject the project or will publish it for information, fixing a date up to

which objections will be received. The objections, if any, will be considered and if the committee still think that the scheme should be carried out, they will re-submit it to the Central Committee with a recommendation to that effect, enclosing any objections received, with their comments thereon, and the opinions of the District Officer, the District Engineer, the Health Officer and the District Agricultural Officer. The Central Committee will advise the Minister and if their advice is favourable and neither the Secretary in the Agricultural Department nor the Finance Department's representative exercises his right to refer the case to the Minister for Agriculture or the Finance Member, the Minister will have power to sanction the execution of the scheme forthwith and to allot funds. If he proposes to sanction the scheme in opposition to the advice of the Central Committee, we consider that the case should be submitted to the Governor in the same way as a case in which two departments have differed. The procedure for execution and realisation of costs will follow the procedure laid down in Act VI of 1920, subject to such simplification of the provisions for apportionment and realisation as may be found feasible.

83. The procedure which we have outlined above is intended to apply to all schemes which will, in the first instance, be financed by Government. We have however learnt with interest that in Bankura, Birbhum and Burdwan districts certain projects have been financed locally by co-operative irrigation societies with the assistance of Central Banks. If a co-operative irrigation society seeks the

help of the District Committee this should be freely given. If the committee accept a scheme, which is to be thus locally financed and is approved by the Executive Engineer as unobjectionable, they should have power to authorise its execution without reference to the Central Committee. Every encouragement should be given to the work of co-operative irrigation societies, but it should be added that neither they nor any one else should be allowed to execute schemes involving interference with water courses except with the approval of the District Committee.

84. If the staff of the Irrigation Department is made adequate for the purpose, works carried out by the Irrigation Department should ordinarily vest in it for maintenance. But if the improvement assists navigation and it is proposed to realise the cost, either wholly or partly, by the levy of tolls the works should vest in the waterways authority. We do not desire to lay down a rule that works should never be made over to local authorities for maintenance, but where water channels are concerned, it is better that they should be in the charge of either the irrigation or waterways engineers.

85. If the action of either the District Committee or the Minister and the Central Committee can be challenged in the Civil Courts, great delay may be caused. We, therefore, recommend that the Civil Courts should be barred from interfering, except in matters of compensation in which there should be a provision for reference to the Civil Courts similar to the provisions in the Land Acquisition Act.

Chapter IX.

The formation of a Waterways Trust.

86. If the proposal that the maintenance of the navigable waterways of Bengal should be removed from the sphere of the Irrigation Department and made over to a separate authority be accepted there are two ways in which such separation might be effected. A new department of Government might be created for the purpose or, in the alternative, an independent Board or Trust might be created and invested with statutory powers to deal with the subject. We have elicited a considerable body of opinion as to the relative advantages of these two systems from public bodies, district officials and others interested in the question and have found an almost universal preference for the latter, a preference which was particularly strongly marked in those parts of Bengal in which navigation is of the most importance.

87. Many reasons were advanced for the feeling that, in a matter of this nature, a Trust formed somewhat on the lines of the Calcutta Improvement Trust or Port Trust would prove a more efficient agency for maintaining the waterways than would a Government department. In the first place, such a body would undoubtedly be able to act more expeditiously than a department of Government. Questions would be discussed and settled by a board in a small portion of the time ordinarily required

under the procedure which governs the working of a Government department. Stress was also laid upon the fact that, were a Trust created, it would be possible to ensure to the public and to local interests a more direct and more effective voice in the administration of the waterways than is possible in the case of a subject directly administered by Government. We have heard much evidence from various local bodies as to the difficulty which they experience in maintaining touch with the Government departments dealing with projects in which they are interested and they were, for the most part, insistent that, in any scheme of reorganisation, not only should an efficient channel for the representation of local requirements be included, but that the districts themselves should be directly represented in the administration of the waterways authority. It was not considered that a mere advisory board would suffice; such a board exists at present but it is seldom convened, and cannot be regarded as affording any real reflection of the views of the people throughout the province. What was demanded was a board, largely non-official, with full executive functions on which representatives of all parties interested in navigation should find a place. Only in this way was it felt that local needs would be given the consideration which they deserve.

88. It was further argued that, from the financial point of view, a Trust would be in a much stronger position as regards the undertaking of work than any department of Government can be. It would, of course, be essential to give to such a Trust power to raise, from users of the waterways, the bulk at least of the funds necessary for their improvement and maintenance. The Trust would thus have its own separate revenues, and, within its resources, would have large powers of expenditure and be able to act promptly and decisively. There would be far greater elasticity in regard to expenditure than obtains at present and the advantage would be achieved that the body approving of schemes would also be that responsible for financing them which is not the case where a Government department is concerned. Moreover the approximate revenue of the Trust would be known well beforehand and it would be possible for it to frame and work to an ordered programme. This is not possible in the case of a department the annual allotment to which, depending as it must upon the fluctuations of the provincial finances and the urgency of other competing demands upon them, necessarily remains an unknown quantity until the beginning of the particular year to which it relates.

89. We consider that the arguments which we have mentioned are conclusive in favour of the handing over of a semi-commercial undertaking such as the waterways to a Trust representative of commercial and public opinion rather than to a department of Government. There are other advantages which we foresee from such a procedure. A very difficult question is that of adjudicating between the waterways and the railways in respect of matters in which action by the latter may affect the interests of the former. This question comes into prominence whenever a new railway extension is proposed; the railways are anxious,

owing to the great expense of bridging, to keep their bridges as low as possible and often to construct them with comparatively narrow spans, while the users of the waterways contend that headway and span should be so chosen as to suit the largest boat or steamer using or likely to use the waterway in question. Our attention has been drawn to many instances in which the waterways are said to have been sacrificed in order that railways might be extended. The issue is often as difficult as it is important and whilst we recognise that the ultimate decision must rest with Government, we feel that the interests of the waterways will be better protected in future than they have been in the past if they are watched by an authority which is specially concerned with them and will not allow their claims to be overlooked.

90. Moreover if, as we hope, the Governments of Bihar and Orissa and of Assam decide to participate in a common administration of the Ganges-Brahmaputra-Meghna series of rivers, such participation will be greatly facilitated if a Trust be formed. The delay which would be inevitable were references between the three Governments involved in every question which concerned them all would be obviated by the direct representation upon the Trust of the other provinces.

91. For all these reasons we recommend that a Board of Trustees, to be known as the Bengal Waterways Trust, be created by statute to take over the navigable waterways from the Irrigation Department and to administer and maintain them throughout the Presidency. In later chapters we shall deal with the constitution, procedure and finances of this Trust and shall put forward proposals which will, in our opinion, make it a representative body while at the same time limiting it to a size consistent with the rapid and effective disposal of business.

Chapter X.

The participation of the neighbouring provinces.

92. Included in our terms of reference is the question whether, in the event of a separate authority being constituted to undertake the maintenance of navigable waterways in Bengal, it would not be desirable to provide for the representation upon it of the neighbouring provinces of Bihar and Orissa and of Assam, so as to secure co-ordination in respect of policy and methods of river conservation throughout the Ganges-Brahmaputra-Meghna series of rivers. We were unable, in the limited time at our disposal, to visit the two provinces in question, but their Governments kindly permitted their Chief Engineers to meet us in Calcutta and to discuss with us the problems which arise in this connection.

93. Dealing first with Assam which, from the point of view of navigation, is the more important of the two provinces, there are two main river valleys to be considered, namely, the Brahmaputra and Surma valleys. Through navigation in the former is practically confined to the main Brahmaputra and to one or two of the larger tributaries which join it from the

south; there are numerous smaller streams which are navigable by country boats, but the traffic on these is almost wholly local. As regards the Surma valley, the main river is navigable by the larger steamers as far as Markholi, and during the rains, there is a subsidiary service to Sylhet. The Surma is navigable by country boats throughout the year, and during the monsoon, when most of the country is under water, boats form almost the only means of communication; but during the dry season, the interior *khals* are but little used. We were informed that there is, at present, no public demand for the opening out of such *khals* although distances could, in this way, be greatly shortened, but the Chief Engineer expressed the opinion that, were one or two *khals* opened out so as to render them fit for navigation throughout the year, a demand would inevitably arise for the similar treatment of others.

94. In Bihar and Orissa both the Ganges and Gogra are navigable by steamers and there is considerable traffic on the Gandak by

country boats. But, generally speaking, the rivers do not provide the principal means of transporting produce, and inland navigation is not of the same importance to the welfare of the people as it is in Bengal and Assam.

95. In neither Bihar nor Assam is any work in connection with the conservation of the rivers undertaken by Government agency, but grants are made to the Joint Steamer Companies on the same lines as those made to the companies by the Government of Bengal for the training of the Ganges, Mahananda and Dhaleswari. The Government of Bihar and Orissa grant a subsidy of Rs. 23,000 for the bandalling of the Ganges from Rajmahal to Digha, and last year the Government of Assam gave a subsidy of Rs. 15,000 for bandalling and snag clearing operations on the Brahmaputra. In neither province are tolls of any description levied from either steamers or boats using the rivers.

96. In view of the description which we have given, we do not feel that, on the ground of securing co-ordination in respect of methods of river conservancy, the case for the participation of the neighbouring provinces in the work of the Bengal Waterways Trust is very strong. This co-ordination is, in fact, secured so long as the present system obtains under which the bandalling of the main rivers is entrusted to a single agency, the steamer companies, and it seems to us probable that, even if a Trust is formed, the same system will continue for some time at least, since it is clearly economical to utilise the services of the companies' officers, who have a life-long experience of the rivers in question, rather than to maintain a special staff for the purpose.

97. But while, for the reasons which we have stated, we do not consider the participation of the neighbouring provinces to be an essential feature of our proposal for the establishment of a Trust, there are certain advantages which would undoubtedly accrue from it. It seems to us almost certain that, sooner or later, the Trust will have to face the question of combating, on a far larger scale than in the past, the growing menace of the water hyacinth, and to this end the active co-operation, and probably the financial assistance, of the neighbouring provinces will be necessary in any measures which may be formulated. Their participation would also greatly simplify the financial procedure connected with the collection of surcharges from steamer companies operating in more than one province. Moreover, it seems probable that cases will arise in which action taken in Bengal by the Waterways Trust will have repercussions on traffic originating in Bihar and Assam, and it is, therefore, desirable that those provinces should be represented on the Trust.

98. The question of the simplification of the financial procedure is, of course, only a secondary consideration. If the Trust is operating and improving the waterways in Bengal alone, there is clearly no case for any surcharge on passengers or goods carried by the steamers except in so far as they are transported over Bengal waters. In the case of inter-provincial booking therefore it would be necessary in every case to determine what proportion of the fare or freight related to carriage through Bengal and what to carriage through another province, and to calculate the

surcharge on the former proportion only. We see no insuperable difficulty in evolving an equitable basis for this calculation, but it entails a complication which it would be preferable to avoid.

99. The Governments of Bihar and Orissa and of Assam have not yet been formally consulted in the matter and we suggest that such consultation should now take place, and their participation in the Trust be invited. They will doubtless examine the question primarily in the light of the advantage which they are likely to gain by participating. It seems to us that, in the case of Assam, the advantage will be material and that participation will lead to a more active policy directed towards the improvement of the facilities for internal navigation; Bihar and Orissa has possibly less to gain, but may well desire a voice in the deliberations of the Trust, seeing that any material improvement of the waterways in Bengal or Assam may affect in a considerable degree through traffic originating in Bihar. We understand from the two Chief Engineers that the handing over of the waterways to an independent authority would create no difficulty in so far as infringement upon the scope of the other operations of the Public Works Department in the two provinces is concerned.

100. While however we consider that the participation of the Governments of Bihar and Orissa and of Assam in the work of the Trust is desirable and recommend that it should be invited, we would not, pending the result of such a reference, postpone the formation of a Waterways Trust for Bengal alone. We regard the establishment of such a Trust as an urgent necessity not only in the interests of navigation but because, until it is created, the reorganisation of the Irrigation Department on the lines which we have advocated elsewhere will be impossible. Various difficult questions arise in connection with the participation of the other provinces, which will have to be settled before such participation can become effective, and the correspondence regarding them will inevitably take some time. It will, for example, be necessary, where legislation prescribes that the local Government should be consulted in regard to the initiation of a scheme, to the appointment of establishment, or to the framing of rules, to decide in which cases all local Governments must be consulted and in which the final decision can be left unreservedly to one of them. Were it proposed that every case must be referred to all three Governments the whole machinery of the Trust would be clogged, and we hope that it may be possible for some procedure to be evolved under which the Governments of Bihar and Orissa and of Assam will delegate the power of decision in matters of minor importance to the Government of Bengal, in view of the predominant interest of the latter in the working of the Trust. The question of legislation also presents difficulty; the Government of India Act appears to provide no specific means for legislation where two or more provinces desire to co-operate and it will presumably be necessary either for an Act to be passed by the Central Legislature or for each of the three provinces to pass identical legislation. The process of drawing up such an Act and of

obtaining agreement on all its details cannot but take time and we are strongly of opinion that the formation of the Bengal Trust should not be delayed until these various questions have been discussed and settled and the neces-

sary joint legislation passed. There will be little difficulty in amending an original Act, applicable to Bengal alone, so as to include the other provinces, if and when they decide to participate.

Chapter XI.

The constitution of the Trust.

101. In considering the constitution of the Trust, we have kept before us two main principles, first, that the Board of the Trust must be representative both of the general public and of commercial interests and, secondly, that it must not be too large. These two principles are to some extent conflicting, but we have endeavoured to reconcile them by recognising that adequate representation on matters affecting a limited area may be secured by the temporary association with the Board of persons representing such an area; by the use of this expedient the Board can be given the benefit of local knowledge and advice without being too large.

102. The composition of the Board will be affected by the decision on the question whether the jurisdiction of the Trust is to extend to the waterways of Bihar and Assam. In framing our proposals we have assumed that it will extend to them, but we have endeavoured to frame them in such a way that, whether with or without representatives from Bihar and Assam, the people concerned in the maintenance and improvement of the waterways will be fairly represented on the Board.

103. When the functions of the Trust are considered, it is clear that certain Government departments and commercial concerns will be greatly interested in its operations, and that it may be of much assistance to the Board to have the views of representatives of such interests. A railway operating in an area where there are waterways may seriously affect or be affected by the development of the waterways. There will be many cases in which the views of the Public Health and Irrigation Departments must be obtained and will carry great weight. Again, the various river steamer companies are vitally concerned in the waterways; two of these companies, the Rivers Steam Navigation and India General Navigation and Railway Companies, have for many years done a large part of the work of maintaining channels fit for steamer services, and it is obvious that the experience and advice of these companies will be of the greatest value to the Board.

104. We do not however propose that either Government departments or river transport companies should be directly represented on the Board. It is desirable that the Board should be able to obtain, either formally or informally, the advice and help of expert officers of Government, such as the Chief Engineer, Irrigation Department, or the Director of Public Health or Railway officers. But one of the functions of such officers will be to advise Government on schemes proposed by the Board, and they would not be free to express their own views in meetings of the Board unless they had ascertained the wishes of Government. We do not consider that, in such circumstances, they should have a voice

in the decisions of the Board. We therefore propose that the constitution should make it possible to associate them in the work of committees of the Board but that they should not be members of the Board itself. On the general principle that persons financially interested in the operations of the Trust either personally or as employees of others should not have a voice in its decisions, we would not allow representatives of river transport companies to be members of the Board. It is usual to disqualify from service on a Board of this nature any person who, either on his own behalf or as a Director, Secretary, Manager or salaried officer of an incorporated company, stands in any contractual relation with the Trust; in the case of the Waterways Trust we would go further and would disqualify from service as a trustee any person who has a direct interest, other than as a mere share-holder, in any firm, company or organisation which provides means of public transport within the area under the jurisdiction of the Trust. We consider it preferable that the views of the transport agencies should be placed before the Board from without, rather than that they should be directly represented upon it. As in the case of the Government experts we would make it possible to associate officers or representatives of such companies in the work of committees.

105. The need, the importance of which we recognise, for securing the representation of local opinion on the Board can, we consider, best be met by the temporary association with the Board of representatives of local areas. During the course of our tours we have met with a universal demand for the direct representation of districts on the Board. A Board containing representatives from all districts interested in waterways would, however, be extremely unwieldy, especially if representatives of other interests were to be added. We therefore put forward in the course of our discussions with District Boards and others the suggestion that District Committees should be formed; these should have a statutory right to be consulted on any new scheme affecting the internal communications of the district and to send a representative to be present when the scheme came up before the Board, to take part in the discussion and to vote as a member of the Board on the question whether or not the scheme be approved. The suggestion was generally welcomed as a fair solution of the problem of giving direct local representation without burdening the Board with an excessive number of members; and we have no hesitation in recommending that it be accepted. We attach great importance to direct contact between the Trust and public opinion in the districts, and consider that, if the District Committees are to be live and

active it is necessary that they should not be merely advisory but should have the statutory rights of being consulted and of sending representatives to the Board itself. They should also be so constituted as to have behind them the principal influences in the district. The District and Local Boards and other important interests should be adequately represented and the District Officer should be a member. We propose that the District Officer, the Chairman and Vice-Chairman of the District Board and the District Engineer be members of the District Committee, that each subdivision be represented by the Chairman of its Local Board and that not more than three other members be nominated by the Commissioner of the Division to represent towns, landholders, or commercial or other interests. It was suggested by the representatives of more than one district that the District Officer should be the chairman of the Committee, but we would prefer to leave the choice of the chairman to the members of the committee. It was also suggested that Sub-divisional Officers should be members of the committee. We agree that their advice will be valuable on account of their intimate knowledge of their subdivisions, but in order to preserve the popular character of the District Committee we should prefer not to make them members. Their assistance will doubtless be at the service of the committee whenever it is required.

106. We turn now to the composition of the Board itself, and will deal first with that part of it which should come into existence even if the waterways of Bihar and Assam do not come under the jurisdiction of the Trust.

107. It is obvious that, for a Board such as is contemplated, the selection of the right kind of chairman is an important matter. It was suggested to us by Sir Charles Stuart-Williams, Chairman of the Port Commissioners, that the Chief Engineer of the Waterways Trust should also be the Chairman of the Board. This would not only secure the advantage of a chairman with technical knowledge, but would also be more economical than having a separate whole-time chairman. We think, however, that the disadvantages of such an arrangement outweigh the advantages. There is the objection that the schemes coming before the Board will ordinarily be submitted to it by the Chief Engineer, and it is better that some one other than the author of the schemes should preside over the deliberations of the Board. It would be essential to choose the Chief Engineer on the basis of his professional qualifications, but a good engineer is not necessarily a good administrator. The argument based on the need of economy is affected by the fact that if the Chief Engineer's time is taken up with administrative work, it will be necessary to give him a stronger staff of subordinate engineers than would otherwise be necessary. But our chief objection to the proposal is that, if the Chief Engineer is to perform both functions, he will be tied to headquarters, especially in the first years of the working of the new authority when new problems of administration will be numerous. We regard it as essential, especially in the beginning, that the Chief Engineer should acquire an intimate knowledge

of the waterways and should make a close personal study of the problems they present. He cannot do this if a large part of his time is to be taken up in administrative work.

108. If this be accepted, the question then is whether a whole-time paid chairman should be appointed to carry on the administration and preside over the meetings of the Board, as in the Calcutta Port Trust and Calcutta Improvement Trust, or whether there should be an unpaid chairman, official or non-official, the details of administration being assigned to a Deputy Chairman or Secretary. The affairs of the Trust are likely to be conducted with more energy if there is a whole-time chairman, and in our opinion he should be a whole-time paid official. But we recognise that a large salary would be necessary to secure the right type of officer, and as the funds of the Trust may not be sufficient to provide both a paid chairman and an engineer of the first class, we recommend that the Act under which the Trust will be constituted should provide simply that the chairman shall be appointed by the Government of Bengal, and that, if a paid chairman be appointed, the pay shall be such as that Government may decide. This would enable the Government to appoint a whole-time officer during the first year or two of the Board's working, when questions of administration are likely to be numerous and difficult, and later, if necessary on grounds of economy, to appoint an unpaid chairman who will not be required to do much more than preside over the meetings of the board.

109. The importance of the river traffic which goes to and from the Port of Calcutta demands that the Port Commissioners should be represented on the Board. Additional reasons are furnished by the interest of the Port in the waters derived by the Hooghly from other rivers, and by the proposal made in a later chapter that the Port Commissioners should contribute to the funds of the Waterways Trust. We think that the Port Trust should ordinarily be represented by the Chairman, but to avoid possible inconvenience would provide that the Chairman, with the approval of the Port Commissioners, may delegate this duty.

110. For the representation of commerce we think that there should be two members, one elected by the Bengal Chamber of Commerce and the other by the Bengal National Chamber of Commerce.

111. It has already been proposed that opinion in the districts should be directly brought to bear upon the administration of the waterways by giving to District Committees the right to send representatives to be temporary members of the board when matters affecting the districts are before it. Such members however will represent district and not provincial opinion, and no district member will be present when larger questions, such as those concerned with the main routes or the annual budget, are before the Board. It is desirable that there should be two full members of the Board who will represent, so far as may be, the public opinion of the province and will also be able to speak with knowledge in the Legislative Council if the need arises. We recommend that these two members should be chosen by ballot by the Legislative Council.

112. The nucleus of the board will thus, in the first instance, be constituted as follows :—

- Chairman (*ex-officio*),
- Chairman of the Calcutta Port Trust (*ex-officio*),
- A Trustee elected by the Bengal Chamber of Commerce,
- A Trustee elected by the Bengal National Chamber of Commerce,
- Two Trustees elected by the Bengal Legislative Council.

113. In an earlier chapter we have advised that an endeavour should be made to bring within the jurisdiction of the Trust the navigable waterways connected with the Ganges in Bihar and with the Brahmaputra and Meghna rivers in Assam. If this be done, it will be necessary to give the provinces of Assam and of Bihar and Orissa representation on the Board. The facts that we have already given show that the waterways in Bihar are much less important than those in Assam, while the number and length of the waterways in Bengal and the traffic upon them are far greater than in Assam. We think that the interests of the three provinces will be fairly represented by allowing one member to Bihar, to be chosen by the Government of Bihar and Orissa, and two members to Assam, one to be elected by the Assam Legislative Council and one to be chosen by the Government of Assam to represent commercial interests in Assam. The Board would thus consist of nine full members. The Chairman of the Trust and the Chairman of the Port

Commissioners will represent general, and not provincial interests; the interests of the two Chambers of Commerce, though more closely connected with Bengal, will also extend beyond the limits of that province. Of the remaining five trustees, two will represent Bengal, two Assam, and one Bihar. District members are likely to come more often from Bengal districts than from Assam, and seldom, if ever, from Bihar; but such members will be concerned only with districts questions, and will not upset the balance of the Board in matters of general interest, including finance.

114. In the event of the participation of the provinces of Bihar and Orissa and of Assam the nucleus of the Board will thus be constituted as follows :—

- Chairman (*ex-officio*),
- Chairman of the Calcutta Port Trust (*ex-officio*),
- A Trustee elected by the Bengal Chamber of Commerce,
- A Trustee elected by the Bengal National Chamber of Commerce,
- A Trustee nominated by the Government of Bihar and Orissa,
- A Trustee nominated by the Government of Assam,
- Two Trustees elected by the Bengal Legislative Council,
- A Trustee elected by the Assam Legislative Council.

Chapter XII.

The duties and procedure of the Trust.

115. To the Trust when created will be entrusted the maintenance, for purposes of navigation, of the waterways system throughout Bengal. It will be its duty to keep the main routes in navigable condition, having regard to the type and size of the steamers and boats using them, to improve them where improvement is required and, if necessary, to construct new routes. A further important duty which will be imposed upon it will be that of keeping a close watch upon the internal system of channels, used by country boats, which serve as feeders to the main rivers and often as short cuts between them; it will be responsible, within the limits of its financial resources, for opening out and improving such channels and for doing everything necessary to facilitate and develop navigation upon them. At present but little is done in this direction although in many districts these internal *khals* form the principal means of communication and transport and are more important than roads. It is necessary that traffic should be controlled, especially at centres of trade and on narrow waters. Such control should be a function of the Trust which should have power to make rules for the purpose.

116. We have considered whether or not it will be desirable to prescribe, by official notification, which waterways are to be included within the jurisdiction of the Trust. Such action might prevent the danger of a clash of the Trust's interests with those of other authorities,

such as the Irrigation Department, but, in view of the machinery which we propose to provide for safeguarding the interests of all concerned in the waterways, we do not think that any such restriction is required. The Act empowering the Trust to perform its duties should, in our view, extend to the whole of Bengal, thus leaving the Trust free, subject to the safeguards to which we have referred, to take action to maintain or improve for purposes of navigation any channel throughout the Presidency.

117. In prescribing the procedure of the Trust we have kept certain broad principles in view. It must have full powers to act quickly and effectively in all matters relating to the maintenance of the rivers, this term including all work required to maintain them in suitable condition for the traffic which has normally been utilising them. It should also be free to meet the demands of District Committees for small new works and improvements without unnecessary delay. As regards larger new works or schemes of improvement it is necessary that other interests, such as those of the Irrigation Department, the Public Health Department and any Railway operating in the tract, should be consulted. Here again we would differentiate between projects of less importance, upon which we would allow the Trust to embark on its own authority provided that the other authorities interested are given

the opportunity to raise objections and that no such objections are raised, and projects of greater importance, to which the specific sanction of the local Government will have to be obtained.

118. Taking these classes of works in order, the Board should be empowered to undertake any work of maintenance without reference to any other authority, subject only to the necessary finance being available.

119. As regards new works, we would classify as minor works those which cost Rs. 10,000 or less. A lump sum provision will be made in the budget of the Trust for such works collectively and, within that provision, the Board should be free to undertake minor works without reference to other authorities. It is improbable that any scheme, which can be constructed for so small a sum, will affect the interests of departments of Government and we would, therefore, in such cases, eliminate the delay which a formal reference to them would necessarily involve.

120. Coming now to major works, we consider that, as in the case of work executed by the Calcutta Improvement Trust, the project, when prepared by the Chief Engineer, should be published for general information, a period of two months being allowed for the lodging of objections. Copies of the notice will be sent at the time of publication to the Secretary in that department of the Government of Bengal to which business connected with the Trust will be assigned, and he will be responsible for passing them on to any other department likely to be interested. In the case of the less important major works, in which category we would include works costing a lakh of rupees or less, it will be open to Government to make an objection within the period of two months; if no such objection be made it will be assumed that none exists. On the expiry of the period the Board will consider the objections, if any, received from the public and may, as a result of such consideration, either abandon the scheme or sanction it, with or without modification. If however an objection is made by Government, the scheme, or any modification of it, will require the sanction of Government before it can be put into execution.

121. The procedure in regard to the more important major works, costing more than one lakh of rupees, will be similar except that a failure of Government to make an objection within the prescribed period will not be interpreted as signifying assent to the scheme. In cases of this nature the Board on the expiry of the period and after consideration of the objections, if any, lodged by the public, will either abandon the project or submit it to Government for sanction. The local Government will then be free to sanction the scheme with or without modification or to refuse to sanction it.

122. We may describe briefly the stages through which a project in which a District Committee is concerned will pass between its initiation and the accord of sanction. Proposals for such projects are likely to come to the Board from either the Chief Engineer or the District Committee or from private persons. If the proposal is received from other sources it will be referred to the District Committee for opinion before any action is taken. The report of the District Committee will then be considered by the Board and, if it decides that the scheme

is a useful one and one for which funds are likely to be available within a reasonable period, the Chief Engineer of the Trust will be directed to prepare a detailed project. We do not consider it necessary that the district representative should attend at the meeting of the Board at which the scheme is first taken into consideration but we would provide that, in the event of the Board disagreeing with the recommendation of the District Committee, no order shall be passed and the matter shall be postponed for further consideration at a later meeting at which a district representative will be invited to be present.

123. When the detailed scheme has been prepared, it will again be referred to the District Committee for opinion and will then again be considered by the Board. If the scheme be a major one, the district representative will be called upon to attend the meetings at which it is considered; in the case of minor schemes he will ordinarily be summoned only if the views of the Board differ from those of the District Committee. It will be unnecessary to call him merely to take part in passing a formal resolution approving of a minor scheme, although he may, of course, be summoned should the Board desire further elucidation of any points concerning it.

124. The procedure which we have already outlined regarding publication and report to Government will then follow, and the scheme will thereafter come before a meeting of the Board for what will usually be final consideration. At this meeting the district representative will be present as a member of the Board. The scheme will then be abandoned, sanctioned, or submitted to Government for sanction as the rules and circumstances of the case dictate.

125. We contemplate that the Board will keep in close touch with the representatives of Government departments, transport companies, and other interests affected by its operations, with a view to obtaining such assistance or advice as it may require in discharging its functions. It should also be empowered to appoint committees, consisting of Trustees or other persons, to which matters may be referred for enquiry and report and to which, if considered desirable, certain of the powers and duties of the board may be delegated. It is possible that committees of this nature, representative of local interests, will prove convenient bodies to undertake such work as the detailed control of shipping wharves, and other matters at some of the inland ports.

126. We recommend that Trustees including the district representatives but excluding the Chairman if a salaried officer should receive fees for attendance at meetings of the Board at which a quorum is present and business is transacted, and that members of committees should receive smaller fees for each meeting of a committee attended by them.

127. We do not propose to deal in detail with the other provisions which will require enactment to regulate the proceedings of the Trust. These provisions might well follow, in general, the corresponding provisions in the Calcutta Improvement Trust Act. Thus in the case of establishment the Board will be the controlling authority, except that orders relating to the appointment, promotion, reduction or dismissal of officers holding posts

the maximum pay of which is Rs. 1,000 or more, will be subject to the previous sanction of the local Government, as will also the number, designation and grades of such officers and the rules made by the Board for regulating matters affecting the servants of the Trust such as security deposits, leave and provident fund. It will conduce to the expeditious despatch of business if power is vested in the Chairman to deal with all questions relating to establishment holding posts the maximum pay of which does not exceed Rs. 300 per mensem, subject to an appeal to the Board in the case of those holding posts the maximum pay of which exceeds Rs. 100 per mensem.

128. The budget estimates of the Trust will be presented by the Chairman and sanctioned by the Board with or without modification. The budget, when sanctioned, will be submitted to the local Government, who

will either approve it or disallow it or any portion of it and return it to the Board for amendment.

129. One matter however may be noted in respect of which we advise departure from the procedure of the Improvement Trust. Under the Improvement Trust Act no contract involving an expenditure exceeding Rs. 1,000 may be made without the previous sanction of the Board. Any such provision would cause most undesirable delay where works are being carried on throughout a whole province, and we prefer the procedure in force in the Public Works Department under which contracts for works are made by the engineers responsible for their execution. The Board should be empowered to frame rules governing the powers of its subordinate officers to sanction estimates, and the same rules should provide for the execution of contracts by these officers.

Chapter XIII.

The finance of the Trust.

130. We come now to the important question of the method in which the proposed Trust is to be financed. It is clear that, if the Trust is to perform its functions efficiently, it must have an income considerably in excess of the amount which is at present spent on the maintenance of navigation. Since additional sources of revenue are limited, it is important that all money derived from such sources should be made available for new works, for improvements or for better maintenance, and that no attempt should be made to utilise it to relieve the provincial exchequer of expenditure which has been chargeable to provincial revenues in the past. In pursuance of this principle we suggest that the first source of the Trust's income should be a grant from the local Government based upon the expenditure actually incurred on navigation during the three years prior to the formation of the Trust. We have not the full information necessary to enable us to calculate the amount of this grant; it will have to be determined by the Accountant-General after a detailed scrutiny of the accounts of the years in question. For the purpose of the calculation any exceptional expenditure, which is unlikely to recur, such as that on the renewal of the bridges on the Calcutta canals, might be excluded from the expenditure side, Government merely undertaking to finance the work in question to completion; similarly from the receipts on capital account should be excluded exceptional and non-recurring receipts such as any large items on account of the sale of land. For the purpose of the calculation we should not regard expenditure upon the sluices on the Lower Kumar as exceptional; new works of one kind or another, to the amount expended annually upon these sluices, may be anticipated in every year. From rough figures which have been placed before us it seems likely that the past normal annual expenditure on navigation will work out at about Rs. 14½ lakhs.

131. In the same way the average receipts from tolls during the last three years should be calculated; the amount will probably be found to be about Rs. 9½ lakhs. Assuming these

figures to be correct we propose that the local Government should hand over to the Trust the existing navigation works in the province and the right to collect tolls upon them, together with a grant of Rs. 5 lakhs, the present deficit on their working. We would exclude from this transfer the Midnapore canal which is primarily an irrigation work and the Hijili Tidal and Orissa Coast Canals which serve the purpose of drainage as well as navigation and, owing to their position, can be more conveniently managed by the Irrigation Department.

132. An important item of the expenditure now incurred, which has been excluded from the figures previously quoted, is the service of the loans raised for the purchase of the two dredgers "Ronaldshay" and "Cowley" amounting to about Rs. 10½ lakhs per annum. This should continue to be borne by the local Government. The dredgers in question, together with the "Foyers", "Alexandra" and "Burdwan" should be made over to the Trust free, but, rather than that the loan should also be transferred with a grant to enable it to be defrayed, we consider that it will be preferable for the local Government to continue to accept responsibility for it. This arrangement may at first sight appear to be unduly favourable to the Trust, but we do not consider this to be the case. If the service of the loans for the dredgers is taken into consideration, the average annual loss on navigation works is about Rs. 15 lakhs, and to this extent, under the principle which we have enunciated, the Trust is entitled to a grant from Government. With Rs. 10 lakhs a year available for loan service, the Trust could afford to purchase new dredgers to replace the five which it is proposed to transfer to them, the cost of such vessels having fallen considerably since the "Cowley" and "Ronaldshay" were purchased. Indeed, from the Trust's point of view, this arrangement would be preferable, as the "Cowley" and "Ronaldshay" are larger than is necessary for the work at present required and could well be replaced by somewhat less powerful machines. This would leave the Government with the

existing dredgers on their hands and with responsibility for continuing to pay interest and to repay the balance of the principal at charge. As the dredgers would probably prove unsaleable, the alternative which we have mentioned is clearly the better for Government. It is in accordance with our original proposition that all income derived from new sources of revenue should be available for extensions of the work at present undertaken; were the dredgers transferred at a valuation this income would have to be devoted to paying for them and there would be no advance. The Trust will, of course, be expected, by debiting depreciation to work and crediting the amount to a separate depreciation account, to establish a fund sufficient to enable the dredgers to be replaced as they become obsolete or useless.

133. We have already mentioned elsewhere that any improvement of the waterways of Bengal should be paid for by the traffic utilising them and we, therefore, propose that a surcharge should be levied upon the fares of passengers and freight of goods carried by the river steamers. This surcharge should, we consider, be levied as a percentage of the amount payable as fare or freight; a flat rate per passenger or per maund would work inequitably as, in the former case, it might enhance unreasonably the fares for short journeys while, in the latter, an addition which a maund of jute might well be asked to bear would kill the traffic if applied to a cheap but heavy commodity such as coal. Once again we are unable to give figures which make any pretence to accuracy, more especially as none are at present available to show what proportion of the passengers and goods booked in Bengal pass over the waters of Bihar and Assam and *vice versa*, but it seems probable that a surcharge of one anna in the rupee on fares and freights would produce a revenue of about Rs. 3,00,000 from passengers and Rs. 14,00,000 from goods. The exact rate to be levied will require further detailed examination when full statistics are available, but it appears to us that rates such as those mentioned might be charged without materially affecting the volume of traffic.

134. Much of the work which lies before the Trust will be in connection with the clearance and improvement of the interior network of waterways which are used by country boats to bring produce to the main rivers; the larger boats will also benefit from the better conservation of the rivers themselves. It is therefore only fair that the boat traffic should contribute its quota to the revenues of the Trust. The principle is undoubtedly correct but it is one which in practice it will not be easy to apply. Information about boats using the rivers of Bengal is far from complete. Their number is not known; no census has ever been taken, and all that can be said is that their variety is extraordinary and their number very great. An informal count made during settlement operations gave the number of boats large and small, in the Dacca Commissioner's Division alone, as nearly 400,000. There are large boats which come down the Ganges in the spring, engage in the jute carrying trade and return to their own country at the end of the year. There is an infinite variety of local boats some of which are regularly engaged in the carrying trade and perform long journeys between the larger centres of trade, whilst others are used for

various purposes and seldom go beyond local waters. It is clear that the benefit derived from the operations of the Trust will vary greatly with the different kinds of boats. For example, boats carrying cargo from the Ganges to Dacca may be saved long journeys and dangerous crossings if some short cut be opened, but fishermen on the Padma or cultivators going to and from their fields in the rains are not likely to receive any direct benefit. Although the opinion was often expressed that all boats should be taxed, discussion generally produced agreement with the principle that taxation should follow benefit and that boats which receive no benefit should be exempted. There are thus two questions to be answered, namely, which boats should be taxed and in what form should the tax be levied.

135. Dealing first with the second question, two forms of taxation have been suggested, namely, the levy of tolls on channels which have been made, improved or restored and the imposition of a license fee on boats similar to that imposed in towns on vehicles. Any idea of a surcharge on freights, as in the case of the steamer companies, may be definitely ruled out as impracticable in the case of vessels which ordinarily ply from point to point, picking up cargoes as they go, and keep no regular accounts. There is no doubt as to the equity of a toll on an improved waterway and we recommend that the Trust should be empowered to levy such tolls on all boats, large or small, using such a waterway. As toll houses will ordinarily be established at the ends of such channels, such tolls will not affect fishermen and cultivators except when they wish to pass out of their local waters.

136. The imposition of a license fee is a more difficult matter. We have already expressed the view that small boats should be exempted, and this raises the other question referred to above, namely, the definition of the class of boat for which a license should be necessary. It has been suggested that any boat carrying passengers or goods for hire should require a license, but probably almost every boat, even those ordinarily used for private purposes, is available for hire if required, and it would entail the maintenance of a very large staff if it were desired to determine whether each particular boat, on each particular voyage, was carrying its owner's or another's goods. An alternative suggestion was that boats of over a certain capacity, such as twenty or fifty maunds, should be licensed; but boats of this size are largely used for local traffic and to ensure complete registration it would be necessary to have a large number of registration stations with inspecting officers; we were told that in the Dacca district such stations would be required at some ten places in each subdivision. We are doubtful whether the amount thus collected would be commensurate with the cost of collection.

137. We are inclined to think, therefore, that licensing should be confined to the larger boats which habitually use the main rivers; these boats draw several feet of water and stand to gain the most from the operations of the Trust. Such boats are utilised exclusively for purposes of trade and are, indeed, the main competitors of the steamers; it is only fair that they too should contribute towards the upkeep of the waterways. We are not in a position, in the absence of statistics of any kind, to make

definite recommendations as to the minimum size of boat to be licensed or as to the amount of fee to be paid, and we suggest that, as soon as the Trust has been formed, it should conduct a special enquiry to collect information about the numbers and operations of such boats, from which it may be possible to calculate what fee can be fairly obtained. If only the larger boats are registered we are assured that registration will present but little difficulty as all of them are bound in the course of trade to come during the year into one of perhaps a dozen major inland ports where they can be readily checked and evasions detected.

138. There are, as we have already explained, no figures to show how many boats ply upon the Bengal rivers or what is their capacity, and we suggest that the opportunity afforded by the coming census should be taken to secure a count of such craft.

139. In the absence of adequate information about boats and their ways, it is not possible for us to make definite recommendations about the taxes which should be imposed on them, nor will it be possible for either the Trust or Government to come to final decisions with any confidence until enquires have been made. It will probably require the experience of several years to determine what form of taxation is the most suitable. We therefore recommend that in the Waterways Act wide powers be taken, and that no attempt be made now to define exactly the taxes which may be levied. We suggest therefore that the Act should empower the Trust :—

- (a) to levy tolls on waterways at rates to be approved by the local Government ;
- (b) to impose a surcharge on the freight of goods and fares of passengers carried by the river steamers and other mechanically propelled vessels, the amount of the surcharge to be approved by the local Government ; and
- (c) to impose a license fee on country boats and other vessels, the amount of the fee and the size or class of boats to which it will be applicable to be approved by the local Government.

140. There are certain canals and other channels on which District Boards are at present levying tolls in consideration of improvements effected at their expense. We recommend that the Trust should be empowered to take over charge of such channels, if they desire to do so, on payment of such compensation as may be fixed by the local Government.

141. We have considered whether it would not be reasonable to ask the Trustees for the Port of Calcutta to contribute to the expenses of the new Trust in view of their very real interest in the maintenance of the river steamer services as feeders for ocean-going traffic. The accounts of the inland vessels wharves show that a substantial profit accrues to the Port Trust even after allowance has been made for interest and sinking fund on the block account of the wharves in question. This profit represents a direct tax on the steamer traffic, over and above payment for service rendered, thus reducing the taxable capacity of the traffic for other purposes. In these circumstances it will, we think, be justifiable, in view of the fact that the Port has a substantial interest in the development of the river steamer traffic, to ask the Port Trust to make an annual contribution to the funds of the Waterways Trust of a sum based upon the average net profit realised from the inland steamer wharves during the three years previous to the constitution of the new Trust. We anticipate that the amount of this subsidy will be about Rs. 2 lakhs.

142. It seems to us that, if the proposals which we have made in this chapter are accepted, it will be possible to obtain for the Waterways Trust an income of some Rs. 35 lakhs a year compared with the Rs. 15 lakhs which is all that is now spent directly on behalf of navigation. With this sum at its disposal, the Trust will be in a position to inaugurate very material improvements in the waterways system of Bengal. The Trust will also have powers, similar to those conferred upon the Port Trust and the Improvement Trust, to raise loans to defray expenditure which can properly be so financed.

143. Projects will undoubtedly be put forward which, while primarily in the interests of navigation, will also improve the drainage, health or agriculture of the tract with which they are concerned. In that case we consider that the local Government should make a special contribution towards the cost of the scheme on account of the benefit likely to accrue from improvements other than those relating to facilities for navigation. Similarly we contemplate contributions being made by the Waterways Trust to the funds of the local Government in aid of projects which, while designed primarily for agricultural or sanitary purposes, will improve navigation. In this way schemes are likely to be taken up which neither the local Government nor the Trust might be willing to finance separately, having regard only to the interests for which they are responsible.

Chapter XIV.

Conclusion.

144. We append a brief summary of the recommendations made in this report.

(i) Demands for investigation of irrigation possibilities should be met (paragraph 32) and a complete hydraulic and agricultural survey made of districts which require irrigation (paragraph 33).

(ii) A detailed investigation is required of the dangerous position created by the Damodar and other embankments (paragraph 36).

(iii) Unauthorised embankments and obstructions to drainage should be rigorously prevented (paragraph 37).

(iv) A hydraulic survey must be made of the Nadia Rivers and a contoured map prepared of the districts which they serve, in order to enable Government to formulate and prosecute a definite policy (paragraphs 38-41).

(v) Hydraulic data should be collected for all important drainages (paragraph 42).

(vi) Waterways require better maintenance and improvement (paragraph 43).

(vii) A complete reorganisation of the Irrigation Department is necessary (paragraph 50).

(viii) Irrigation, Embankments and Drainage should be kept together under one department and navigable waterways administered by a separate authority (paragraphs 51-57).

(ix) The Irrigation Department staff should be augmented (paragraph 58).

(x) Boundaries of divisions should coincide where possible with boundaries of civil districts (paragraph 61).

(xi) Besides the Chief Engineer there should be four Superintending Engineers and eleven Executive Engineers not including the Executive Engineer in charge of the temporary Bankura Division. One of these Superintending Engineers should be a Drainage Officer to watch over drainage interests throughout the province (paragraphs 62-69).

(xii) Both Government and officers of the Irrigation Department should be brought into closer touch with district opinion. The procedure for preparing and financing improvement schemes should be simplified (paragraphs 70-73).

(xiii) District Committees should be established to co-ordinate local effort and establish closer relations between the Irrigation Department and local bodies (paragraph 74).

(xiv) To prevent delays due to inter-departmental references a Central Committee consisting of representatives of departments should be formed to advise the Minister in charge of the Local Self-Government Department who should deal with improvement schemes on the advice of this committee (paragraphs 75-77).

(xv) Government should advance the cost both of the preparation of schemes and the execution of work from provincial loans (paragraph 78).

(xvi) The cost of schemes of improvement should be recovered from those benefited, but a small grant may be placed at the disposal of the Minister for contributions from provincial revenues in exceptional cases (paragraph 78).

(xvii) Estimates should provide for cost of maintenance not in perpetuity but for a period of years only (paragraph 79).

(xviii) Charges for establishment, tools and plant, and audit should be reduced to 10 per cent. of the cost of the work (paragraph 80).

(xix) The provisions for apportionment of costs should be simplified and made as elastic as possible. The possibility of realising the costs in the form of a cess should be investigated (paragraph 81).

(xx) A procedure is proposed for the working of the District and Central Committees (paragraph 82).

(xxi) A reference to the Central Committee should not be required in the case of minor works financed by co-operative societies (paragraph 83).

(xxii) Improvement works carried out by the Irrigation Department should ordinarily vest in it for maintenance (paragraph 84).

(xxiii) The civil courts should be debarred from interfering in improvement schemes save as regards compensation (paragraph 85).

(xxiv) The administration of navigable waterways should be handed over to a Waterways Trust representing commercial and public opinion (paragraphs 89, 91).

(xxv) The participation of Assam and of Bihar and Orissa in this Trust is not essential but desirable and should be invited (paragraphs 96-99).

(xxvi) The establishment of the Trust should not be delayed pending the participation of the neighbouring provinces (paragraph 100).

(xxvii) Government departments and river transport companies should not be directly represented on the Trust but there should be provision for associating them in the work of committees (paragraphs 103-104).

(xxviii) District Committees should be created with the statutory right of being consulted on schemes affecting the district and of sending a member to sit on the Board when such schemes are under discussion (paragraph 105).

(xxix) The Chairman of the Trust should be a whole-time paid official appointed by Government; but the Act should not preclude the appointment of an unpaid chairman (paragraphs 107-108).

(xxx) The other trustees should be the Chairman, Port Commissioners, Calcutta, two members to represent commerce, one chosen by the Bengal Chamber of Commerce and the other by the Bengal National Chamber of Commerce, and two members chosen by ballot by the Bengal Legislative Council (paragraphs 109-112).

(xxxi) If the neighbouring provinces participate there should be in addition one member appointed by the Government of Bihar and Orissa, one by the Government of Assam and one chosen by ballot by the Assam Legislative Council (paragraphs 113-114).

(xxxii) The Act empowering the Trust to maintain and improve waterways should extend to the whole of Bengal (paragraphs 115-116).

(xxxiii) The Trust should be authorised to undertake without reference to any other authority any maintenance work (paragraph 118) and any new work not costing more than Rs. 10,000 (paragraph 119).

(xxxiv) Schemes for larger works should be published and a time allowed for objections; thereafter the Trust should have power to proceed with schemes costing not more than Rs. one lakh in the absence of Government objections (paragraph 120) but should obtain Government sanction to schemes costing more than Rs. one lakh (paragraph 121).

(xxxv) The procedure for cases in which District Committees are concerned and the occasions on which their representatives will be called are defined (paragraphs 122-124).

(xxxvi) The Board should have power to appoint committees, including committees for local purposes (paragraph 125).

(xxxvii) The budget of the Trust should be subject to the approval of Government (paragraph 128).

(xxxviii) The Trust should receive an annual grant from Government based on the net expenditure of the last three years (paragraphs 131-131).

(xxxix) With specified exceptions existing navigation works should be handed over to the Trust with the right to collect tolls on them (paragraph 131).

(xl) The dredgers should be handed over to the Trust, Government remaining responsible for repayment of the loans incurred for their purchase (paragraph 132).

(xli) A surcharge should be levied on the fares of passengers and the freight of goods carried by river steamers (paragraph 133).

(xlii) Tolls should be levied on improved waterways (paragraph 135).

(xliii) License fees present difficulties and an enquiry is necessary; but the Act should provide power to impose such fees (paragraphs 136-139).

(xliv) The Trust should be empowered to take over on payment of compensation, channels on which tolls are now levied by district boards (paragraph 140).

(xlv) The Port Trust, Calcutta, should make an annual contribution to the funds of the Trust (paragraph 141).

(xlii) The Trust should have power to raise loans (paragraph 142).

145. The first action required is an examination of the question of providing funds for the recurring cost of the enlarged Irrigation Department and the method in which its works will be financed. The legislation necessary to create the Waterways Trust should also be taken in hand immediately; the reorganisation of the Irrigation Department on the lines we have proposed can only be effected after the Trust has been formed. The revision of Act VI of 1920 is another matter which calls for early action, as it is most desirable that the amended Act should be ready by the time the staff is recruited and the District Committees are ready to work. As soon as a decision has been reached on the financial questions, sanction should be obtained for the increase of staff and the creation of the new Circles and Divisions. The additional staff should then be engaged forthwith; it will probably be necessary to recruit some portion of it on a temporary basis to fill the posts while the permanent cadre is being built up. As soon as the staff is available, but not before, the District Committees to assist the new Irrigation Department should be formed, and investigation work should begin.

146. In making our proposals we have kept prominently in mind the limitations imposed by the financial position of the province, and we have framed them in such a way as to keep the increase

of cost which will fall on provincial revenues as low as possible. The cost of the improvement and better maintenance of the waterways will fall upon those who use them. The cost of irrigation works and the execution of schemes for the restoration of rivers, for flushing and for drainage, although in the first instance the credit of the province will be pledged in order to finance them, will ultimately be paid by those who are benefited by the works. But the cost of the general surveys which we have advocated and the bulk of the increased expenditure on staff, which is essential if Government are determined to remedy the shortcomings of the past, will necessarily fall upon provincial revenues. We trust that this issue will be squarely faced and that no attempt will be made to give effect to such of our proposals only as involve little or no expenditure and to let the others wait. Our recommendations are all interconnected and should be regarded as part of a single scheme.

147. In conclusion, we desire to emphasise the urgent need of determined action by both Government and the Legislature if the deterioration which is taking place in Bengal is to be checked. The work that awaits the new waterways authority is important and should prove of great value to the people of Bengal; that which awaits the Irrigation Department is not only important but is a matter of life or death to much of the province. There is in some of the districts of Bengal a feeling akin to despair caused by the decline in health and agriculture consequent on the failure of the rivers and by the apparent inability of Government to provide a remedy. This feeling is widespread. It is not confined to the people of these districts but is shared by those whose work brings them into contact with it, and not least by the officers of the Irrigation Department who feel the need and are denied the means of meeting it. We have endeavoured to suggest the course which should be followed, but the point which above all others we desire to emphasise is that, if decay is to be arrested, Government must define their policy and carry it out vigorously and the Irrigation Department must no longer be denied the men and money it requires.

W. S. HOPKINS, *Chairman*.

D. G. HARRIS, *Member*.

J. B. G. SMITH, *Member*.

A. E. PORTER, *Secretary*. [27]

15th March, 1930.

APPENDIX A.

Diary of tours.

1930.

JANUARY, 7th-8th	Calcutta to Mymensingh by rail and steamer. River protection works at Sirajganj and Mymensingh, and bridge over old Brahmaputra.
" 9th	Recorded evidence at Mymensingh. Mymensingh to Dacca by rail.
" 10th	Recorded evidence at Dacca. Dolai khal.
" 11th	Recorded evidence at Dacca. Buriganga and Turag rivers.
" 12th	Dacca to Sabhar by road. Sabhar to Narayanganj by launch <i>via</i> Dhaleswari river and Sitalakhya khal.
" 13th	From Narayanganj up Meghna to Chandanta by steamer and back to Chandpur.
" 14th	Recorded evidence at Chandpur.
" 15th	Chandpur to Goalundo by steamer. Recorded evidence at Goalundo.
" 16th	Goalundo to Pabna by steamer. Revetment works.
" 17th	Recorded evidence at Pabna. Pabna to below Sardah by steamer. Gorai head.
" 18th	Arrived Shahapur Ghat by steamer. Revetment works at Rajshahi. Recorded evidence at Shahapur Ghat.
" 19th	Rajshahi to Kaliganj and back to Lalgola Ghat by steamer. Heads of Bhairab and Bhagirathi.
" 20th	Lalgola Ghat to Bhugwangola by rail. Bhugwangola to Berhampore by road. Bhagirathi embankments and Gobra Nala scheme. Recorded evidence at Berhampore.
" 21st	Berhampore to Krishnagar by rail. Recorded evidence at Krishnagar.
" 22nd	Anjana khal. Krishnagar to Calcutta by rail.
" 27th	Calcutta to Masagram by rail. Masagram to Burdwan by road. Eden canal and Damodar embankments.
" 28th	Recorded evidence at Burdwan.
" 29th	Burdwan to Rondia and back by road. Damodar Canal and Headworks construction. Burdwan to Calcutta by rail.
FEBRUARY, 4th	Calcutta Canals and Bidyadhari river.
" 5th	Calcutta to Diamond Harbour and back by rail. Magra Hat Drainage Scheme.
" 7th	Calcutta to Kolaghat and back by rail. Kolaghat to Gopiganj and back by steamer. Rupnarayan embankments and Midnapore Canal.
" 8th	Tolly's Nullah.
" 9th	Left Calcutta by rail.
" 10th	Arrived Rangpur by rail. Recorded evidence at Rangpur. Rangpur to Dinajpur by rail.
" 11th	Recorded evidence at Dinajpur. Atrai and other drainages. Left Dinajpur by rail.
" 12th	Arrived Malda by rail. Recorded evidence at Malda. Left Malda by rail.
" 13th	Arrived Calcutta by rail.
" 15th	Left Calcutta by steamer. Doa Agra channel and Saptarmukhi crossing.
" 16th	Sundarbans route.
" 17th	Arrived Khulna by steamer.
" 18th	Recorded evidence at Khulna. Khulna to Maipur khal and back by launch. Left Khulna by steamer.
" 19th	Arrived Char Maguria by steamer. Halifax Cut, Madaripur Bil route, Lower Kumar river. Inspected dredgers at work.
" 20th	Recorded evidence at Char Maguria. Char Maguria to Barisal by steamer.
" 21st	Recorded evidence at Barisal. Left Barisal by steamer.
" 22nd	Arrived Sandwip by steamer.
" 23rd	Sandwip to Chittagong by steamer. Karnaphuli river by launch.
" 24th	Recorded evidence in Chittagong. Local drainages. Left Chittagong by rail.
" 25th	Arrived Chandpur by train. Left Chandpur by steamer. Barhami khal.
" 26th	Arrived Khulna by steamer. Khulna to Jessore by rail. Recorded evidence in Jessore. Bhuiab and Kobadak rivers.
" 27th	Jessore to Calcutta by rail.

APPENDIX B.

List of persons whose oral evidence was taken or whose opinions were invited at meetings of the Committee.

[Note.—From those persons or bodies marked with an asterisk the Committee received also representations or information in writing.]

Place.	Date.	Name.	Designation.
1930.			
Calcutta	.. 24th January	.. Mr. C. R. Sumner	.. India General Navigation and Railway Co., Ltd.*
		Mr. J. Y. Philip	.. Rivers Steam Navigation Co., Ltd.*
	25th	.. Mr. J. R. Coats	.. Chief Engineer, Corporation of Calcutta.*
		Dr. B. N. Doy*	.. Special Officer, Corporation of Calcutta.

Place.	Date.	Name.	Designation.
1930.			
Calcutta	30th January	.. Rai S. N. Banarji Bahadur*	.. Superintending Engineer, Irrigation Department, South-Western Circle.
		Babu S. C. Mazumdar	.. Executive Engineer, Irrigation Department, Bankura Division.
		Babu D. N. Sen Gupta	.. Executive Engineer, Irrigation Department, Cossye Division.
		Babu A. N. Mitra*	.. Executive Engineer, Irrigation Department, Damodar Division.
		Babu S. L. Maitra*	.. Subdivisional Officer, Storos, Dredger Division.
	31st ..	.. Dr. C. A. Bentley, C.I.E.	.. Director of Public Health.
		Mr. F. C. Griffin	.. Chief Engineer, Public Health Department.
	1st February	.. Mr. E. L. Glass*	.. Chief Engineer, Irrigation, and Secretary to the Government of Bihar and Orissa.
		Mr. B. A. Blenkinsop*	.. Chief Engineer, Public Works Department, and Secretary to the Government of Assam.
	3rd ..	.. Mr. J. A. L. Swan, C.I.E., I.C.S.	.. Chairman, Calcutta Improvement Trust.
		Babu Priyanath Roy	.. East Bengal River Steam Service, Limited.*
		Babu Jadunath Roy	.. Bengal National Chamber of Commerce.*
	6th ..	.. Sir Charles Stuart-Williams, K.T.*	.. Chairman, Port Commissioners, Calcutta.
		Commander C. V. L. Norcock, O.B.E., R.N.	.. Deputy Conservator, Port of Calcutta.
		Mr. R. S. O'Brien	.. Officer in charge, Port Approaches, Calcutta.
	13th ..	.. Mr. T. A. Curry	.. Superintending Engineer, Irrigation Department, Southern Circle.
	14th ..	.. Mr. F. A. Sachse, C.I.E., I.C.S.*	.. Member, Board of Revenue.
	1st March	.. Sir William Willecocks, K.C., M.G.*	..
	5th ..	.. Rai A. C. Banarji Bahadur	.. Chairman, District Board, Birbhum.
		Mr. A. Cassells, I.C.S.	.. Secretary, Finance Department.
Mymensingh	9th January	.. Mr. G. S. Dutt, I.C.S.*	.. Magistrate and Collector, Mymensingh.
		Rai Umesh Chandra Chakladar Bahadur.*	.. Vice-Chairman, District Board, Mymensingh.
		Mr. N. A. Williamson*	.. District Engineer, Mymensingh.
		Babu Surendra Nath Sen	.. Secretary, Mymensingh Landholders' Association.
Dacca	.. 10th ..	.. Babu Sarat Chandra Chakravartti*	.. Secretary, Dacca-Mymensingh River Improvement Committee.
		Rai Keshab Chandra Banarji Bahadur.	.. Chairman, District Board, and Vice-Chairman, Municipality, Dacca.
		Maulvi Sahabuddin	.. Vice-Chairman, District Board, Dacca.
		Khan Bahadur K. M. Afzal	.. Commissioner, Dacca Municipality.
		Mr. R. B. McCormick	.. District Engineer.
		Babu Aswini Kumar Das	.. Municipal Engineer.
		Mr. A. L. Godden*	.. Joint Agent, India General Navigation and Railway and Rivers Steam Navigation Companies and President, Narayanganj Chamber of Commerce.
		Mr. J. E. Ordish, M.L.C.	.. Messrs. David & Co.
		Mr. J. W. R. Stevens	.. Messrs. R. Sim & Co.
		Dr. G. P. Hector, M.A., D.Sc.*	.. Director of Agriculture.
		Mr. H. C. E. Peterson	.. Agricultural Engineer.
		Mr. O. M. Martin, I.C.S.*	.. Magistrate and Collector, Dacca.
		Mr. S. N. Guha Ray, I.C.S.	.. Subdivisional Officer, Narayanganj.
		Mr. S. Banu, I.C.S.*	.. Subdivisional Officer, Munshiganj.
		Babu Jogesh Chandra Guha	.. Chairman, Sadar Local Board, Dacca.
Chandpur	.. 14th ..	.. Mr. S. K. Sen, I.C.S.	.. Subdivisional Officer, Chandpur.
		Mr. P. M. O. Hopkins	.. Joint Steamer Companies' Agent, Goalundo.
		Mr. W. E. Violet	.. Joint Steamer Companies' Agent, Chandpur.
		Mr. Dennis Mackertich	.. Messrs. Moran Bailing Co., Ltd.
		Mr. W. E. Duncan	.. Messrs. The Chittagong Co., Ltd.
		Mr. A. W. Mackertich	.. Messrs. Forrester & Co., Ltd.
		Mr. G. Allan	.. Messrs. The Union Jute Co., Ltd.
		Mr. J. N. Smart	.. Messrs. Landale and Clark, Ltd.
		Mr. D. Walker	.. Messrs. R. Sim & Co., Ltd.
		Mr. J. P. Jones	.. Messrs. M. David & Co.
		Mr. C. O. Foden	.. Pilot Superintendent of the Joint Steamer Companies.
		Babu Bujrung Lal	.. Messrs. Surujmal, Nagarmal.

Place.	Date.	Name.	Designation.
1930.			
Chandpur ..	14th January	.. Mr. F. W. Robertson, I.C.S. Babu P. C. Bhattacharyya*	.. District Magistrate and Collector, Tippera. .. District Engineer, Tippera.
Goalundo ..	15th "	.. Khan Bahadur Maulvi Alim-uz-Zaman Chaudhuri*. Dr. A. K. Sarkar	Chairman, District Board, Faridpur. .. District Health Officer, Faridpur.
Pabna ..	17th "	.. Rai A. C. Dutt Bahadur Maulvi Khondkar Ali Taib Maulvi A. M. Abdul Hamid* Babu J. K. Das Gupta* Maulvi Suiyid Akbar Ali Maulvi Rukanuddin Ahmad Maulvi Holaluddin Ahmad Rai Sahib P. N. Chaudhuri Babu Jalnabicharan Bhaumik Mr. P. N. Biswas*	.. District Magistrate and Collector, Pabna. .. Sadar Subdivisional Officer, Pabna. .. Chairman, District Board, Pabna. .. District Engineer, Pabna. .. Member, District Board, Pabna, and Chairman, Local Board, Sirajganj. .. Member, District Board, Pabna. .. Ditto. .. Ditto. .. Government Pleader, Pabna. .. Divisional Engineer, Telegraphs (Retired).
Shahapur Ghat.	18th "	.. Mr. S. K. Ghosh, I.C.S. Mr. B. N. Ray* Babu N. G. Mukharji* Babu Kishorimohan Chaudhuri Mr. R. W. Taylor*	.. Magistrate and Collector, Rajshahi. .. Chairman, District Board, Rajshahi. .. District Engineer, Rajshahi. .. Rajshahi Association. .. Executive Engineer, Abdulpur-Nawabganj Railway.
Borhampore ..	20th "	.. Mr. J. N. Chattarji* Khan Bahadur Abu Ali Muhammad Chaudhuri. Rai Sahib Phanibhusan Mitra Babu Girish Chandra Sen Babu Surendra Mohon Bhowmik Babu S. N. Singha Maulvi Abdus Samad* Babu Dwijapada Chattarji Khan Bahadur Ekramul Huq Babu J. N. Chaudhuri Rai Sahib A. C. Mitra* Babu Bhimapada Ghosh Babu K. K. Banarji Haji Muhammad Ayub. Haji Muhammad Yusuf.	.. Magistrate and Collector, Murshidabad. Subdivisional Officer, Kandi. .. Subdivisional Officer, Sadar, Murshidabad. .. Subdivisional Officer, Jangipur. .. Subdivisional Officer, Lalbagh. .. Chairman, District Board, Murshidabad. .. Vice-Chairman, District Board, Murshidabad. .. Member, District Board, Murshidabad. .. Ditto. .. Ditto. .. District Engineer, Murshidabad. .. Chairman, Local Board, Kandi. .. Vice-Chairman, Murshidabad Association.
Krishnagar ..	21st "	.. Mr. T. C. Roy* Babu H. R. Sen* Babu S. P. Sarkar Rai Sahib A. C. Samanta Babu Gunamay Chattarji Dr. N. N. Mukharji Rai N. N. Mukharji Bahadur* Khan Bahadur Azizul Huq Rai S. C. Chattarji Bahadur* and others.	.. District Magistrate and Collector, Nadia. .. Subdivisional Officer, Ranaghat. .. Subdivisional Officer, Chuadanga. .. Sadar Subdivisional Officer, Nadia. .. Subdivisional Officer, Meherpur. .. Civil Surgeon, Krishnagar. .. Chairman, District Board, Nadia. .. Vice-Chairman, District Board, Nadia. .. Members of the District Board, Nadia.
Burdwan ..	28th "	.. Mr. R. Douglas, I.C.S. Babu K. C. Chattarji* Babu Rakhai Chandra Das The Superintendent of the Burdwan Raj with his legal advisor and Engineer. Dr. S. N. Mitra, Rai Bahadur Raja Manilal Singh Roy, C.I.E., of Chakdighi*. Rai T. P. Mukharji Bahadur, C.I.E. Babu Bhupendra Nath Basu* Maulvi Abul Kasem.	.. District Magistrate and Collector, Burdwan. .. Chairman, Local Board, Burdwan. .. Member, Local Board, Burdwan, Chairman, Co-operative Central Bank, Municipal Commissioner. .. Civil Surgeon, Burdwan. Chairman, District Board, Burdwan. Vice-Chairman District Board, Burdwan. .. District Health Officer.
Rangpur ..	10th February	.. Mr. T. M. Dow, I.C.S. Babu Hiralal Mukharji Babu U. C. Datta	.. District Magistrate and Collector, Rangpur. .. Subdivisional Officer, Nilphamari. .. Subdivisional Officer, Kurigram,

Place.	Date.	Name.	Designation.
1930.			
Rangpur	10th February	Rai S. C. Chattarji Bahadur*	Chairman, District Board, Rangpur.
		Babu L. C. Sen Gupta*	District Engineer, Rangpur.
		Babu J. N. Chattarji	Chairman, Local Board, Rangpur.
Dinajpur	11th „	Mr. L. C. Guha*	District Magistrate and Collector, Dinajpur.
		Rai Sahib J. M. Sen*	Chairman, District Board, Dinajpur.
		Maulvi O. Gani Chaudhuri	Vice-Chairman, District Board, Dinajpur.
		Babu J. K. Sen Gupta	District Engineer, Dinajpur.
		Babu J. C. Chakravarti	Chairman, Dinajpur Municipality.
		Rai S. C. Chakravarti Bahadur	Superintending Engineer, Public Works Department, Bihar and Orissa (Retired).
English Bazar	12th „	Rai Panchanan Mazumdar Bahadur*	Chairman, District Board, Malda.
		Babu Surendra Nath Banarji	District Engineer, Malda.
		Babu Ashutosh Misra	Member, District Board, Malda.
		Babu K. P. Saha*	Municipal Commissioner, English Bazar.
		Maulvi Kader Baksh*	Ditto.
		Babu J. N. Mitra*	Sadar Subdivisional Officer, Malda.
		Babu Ishwar Lal Ghosh	Pleader.
		Babu Rambiranjana Singh.	
		Maulvi Fakrul Islam Wahed	District Agricultural Officer, Malda.
		Babu K. K. Guha*	Sectional Officer, Irrigation Department, Malda.
Khulna	18th „	Mr. H. Quinton, I.C.S.*	District Magistrate and Collector, Khulna.
		Rai H. C. Sarkar Bahadur	Civil Surgeon, Khulna.
		Rai Jotindra Nath Ghosh Bahadur*	Chairman, District Board, Khulna.
		Babu Mahendra Kumar Ghosh	Vice-Chairman, District Board, Khulna.
		Babu Nagendra Nath Sen	Member, District Board, Khulna.
		Babu Hemnath Banarji	Ditto.
		Babu S. C. Ghosh	District Engineer, Khulna.
Char-Maguria	20th „	Mr. E. B. H. Baker, I.C.S.	Subdivisional Officer, Madaripur, Chairman, Char-Maguria Advisory Committee.*
		Mr. W. D. Morgan	Joint Steamer Companies' Agent and Member, Char-Maguria Committee.
		Mr. J. Lawrence	Member, Char-Maguria Committee.
SS. "Ardgour"	20th „	Mr. C. Addams Williams, C.I.E.	Chief Engineer, Irrigation.
Barisal	21st „	Mr. J. T. Donovan, I.C.S.	Magistrate and Collector, Bakarganj.
		Mr. Saiyid Muhammad Hossain*	Chairman, District Board, Bakarganj.
		Maulvi Abdul Waheb Khan	Vice-Chairman, District Board, Bakarganj.
		Babu Srinath Ghosh	Secretary, District Board, Bakarganj.
		Haji Chaudhuri Ismail Khan	Member, District Board, Bakarganj.
		Babu H. N. Chattarji*	District Engineer.
		Babu B. K. Banarji	Vice-Chairman, Barisal Municipality.
		Babu S. K. Gupta	Secretary, Bar Library, Barisal.
		Mr. G. Hollingbery	Joint Steamer Companies' Agent, Barisal.
		Mr. F. Boyle	Rivers Steam Navigation Company, Barisal.
Chittagong	24th „	Mr. H. R. Wilkinson, C.I.E., I.C.S.*	District Magistrate and Collector, Chittagong.
		Maulvi Jalaluddin Ahmad*	Chairman, District Board, Chittagong.
		Khan Sahib S. Nadir Ali	Member, District Board, Chittagong.
		Maulvi Abdul Halim	Ditto.
		Maulvi Fazlur Rahaman Khan	Ditto.
		Maulvi Abdul Jalil	Ditto.
		Haji Badi Ahmad Chaudhuri	Ditto.
		Rai Upendra Lal Ray Bahadur	Ditto.
		Babu Nalini Bhusan Mazumdar	District Engineer, Chittagong.
Jessore	26th „	Babu S. C. Ghosh	Sadar Subdivisional Officer.
		Saiyid Abdur Rauf	Vice-Chairman, District Board, Jessore.*
		Saiyid Majid Baksh	Member, District Board, Jessore.
		Rai J. N. Mazumdar Bahadur, C.I.E.*	Ditto.
		Rai B. K. Mitra Bahadur	Member, District Board, Jessore and Chairman, Jessore Municipality.
		Babu K. N. Ghose	District Engineer.
		Babu M. N. Ganguli	Pleader.
		Babu J. N. Mitra	Ditto.

APPENDIX C.

List of persons or bodies not orally examined from whom written representations were received.

- (1) The Bengal Chamber of Commerce.
- (2) The Indian Chamber of Commerce.
- (3) The Bengal Assam Steamship Co., Ltd.
- (4) The Bangiya Inland Steam Navigation & Trading Co., Ltd.
- (5) The Assam-Bengal Railway.
- (6) The Eastern Bengal Railway.
- (7) The Registrar of Co-operative Societies, Bengal.
- (8) The Chairman, Port Commissioners, Chittagong.
- (9) The India Jute Mills Association.
- (10) The Association of Engineers, Bengal.
- (11) The District Board, Noakhali.
- (12) The Local Board, Manikganj.
- (13) The Municipality, Rajshahi.
- (14) The District Engineer, Faridpur.
- (15) The Revd. J. H. Brown, Gobardanga.
- (16) Babu S. K. Ghosh Maulik, Calcutta.
- (17) Dr. C. Strickland, Professor of Medical Entomology, School of Tropical Medicine, Calcutta.
- (18) Babu G. M. Das, A.M.I.E. (IND.), Calcutta.
- (19) Babu G. L. Mukharji, Calcutta.
- (20) Babu Brajendra Kishor Raychaudhuri, Mymensingh.
- (21) Babu Ashutosh Lahiri, recently District Engineer, Rangpur.
- (22) Babu Sailjukumar Sanjal, of Salap, Pubna.
- (23) Babu Jibanhari Samanta and others, Arambagh.
- (24) Babu J. C. Samanta, Honorary Secretary, Barachowka Flood Relief Committee (Midnapore).
- (25) Babu Akshay Kumar Mitra and others, Howrah.
- (26) Babu Krishnabihari Maitra and others, Nadia.
- (27) Babu Kshitish Chandra Bhattacharyya, Nadia.
- (28) The inhabitants of certain villages in the Kushtia subdivision.
- (29) The Banskhali Moslem Samiti, Chittagong.
- (30) Residents of police-station Anwara, Chittagong.
- (31) Inhabitants of villages on the banks of the Boral river.

